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UNITED SERVICE INSTITUTION OF INDIA GOLD
MEDAL ESSAYS, 1909.

SECOND ESSAY.

Specially awarded a Silver medal.

SUBJECT.

"The future of the native officer, the extent to which the system of direct commissions as opposed to promotion from the ranks, should be resorted to. The scope of his employment, and the possibility of providing for him a wider career whether within or outside of the army, having regard to past history, present conditions and aspirations."

BY MAJOR A. M. S. ELSMIE, 56TH PUNJABI RIFLES (F.F.).

MOTTO:—*Aequam mentem servare mentem.*

"THE FUTURE OF THE NATIVE OFFICER."

The Indian Army offers no career which can satisfy the reasonable ambition of an able, well-educated, well-bred Indian gentleman. The spirit of progress and reform, which is rapidly offering a larger and more responsible share in administrative posts to Indian candidates, will assuredly demand in the near future the possibility of a wider and more important career for the sons of Indian gentry and nobility in the Indian Army.

If the above assumptions are proved to be correct, it is quite evident that, sooner or later, steps must be taken to improve the position and prospects of the Indian gentleman, whose military ardour induces him to seek a career in the army of the British Empire. The objects of this essay are to emphasize the necessity and advantages of reform, to demonstrate the justice of the claims, and to point out a method by which it is firmly believed that these aspirations can be satisfied without jeopardizing the complex and intricate fabric of the Indian Empire.

In the great empires of the past the higher ranks of the army presented an honourable profession to scions of the best blood, even of an alien community. **Necessity for enrolment of nobility in the higher ranks of the army.** Alexander enlisted nine distinguished Persians in the royal 'Agema' itself, and, shortly after the death of Darius, established Hellenic military schools in all the Persian provinces. He arranged that the Persian youth should be drilled and disciplined in Macedonian fashion, and at the end of five years had organized a self-contained army of 30,000 Hellenised barbarians. This innovation was not appreciated by the veteran Macedonian troops, who practically mutinied *en masse*. Still, nothing but the untimely death of Alexander prevented the consummation of his broad-minded Imperial policy. The Romans also admitted to all the highest military commands, the noble youth of nations incorporated in the Roman Empire. The descendants of the Gauls, who had resisted the triumphant march of the legions of Cæsar, became commanders of Roman armies. Turning to more modern and more closely-connected history, we find that the Muhammadan conquerors of India appointed native chiefs to all important posts. The great Akbar entered into the most intimate relations with the Rajputs, whose sons led his armies in the field, achieved his conquests, and filled the principal posts in his administration.

The advantages reaped by a State through the enrolment of the upper classes into the army, are considerable. So powerful an element is the personal factor that, even in the present democratic age, the well-bred youth, English or Japanese, German or Afghan, Muhammadan or Hindu, starts with a great initial advantage as a leader of men. In addition to this the military training of the upper class is essential for keeping alive the martial instincts of a race. It is an invariable rule that the lower class of a nation gradually imbibes the ideas and predilections of the upper class. If the latter considers it to be an honour to follow the profession of arms, the former is prepared to make great sacrifices for a national cause. No sooner does the aristocracy, through the decadence of its moral fibre and from a growing passion for the enervating luxuries of civilisation, delegate all military duties to others, then an antipathy to a military career gradually permeates the entire mass of the population. During the height of Rome's prosperity, and for some time prior to her eventual decline, her armies were commanded for the most part by officers of a liberal birth and education. At the time of the decline,

military service had proved distasteful to the nobility of the Empire and had, in consequence, been pronounced to be degrading. National decay inevitably followed the atrophy of martial instincts. If we wish a nation to retain its virility, the importance of fostering a military spirit among the higher classes of the community is thus self-evident. The complaint is frequently heard that under British rule in India races lose their fighting instincts. Is not the neglect of cardinal principles quite sufficient to account for the phenomenon? Once a military career is closed to the upper class, it is only a matter of time before all military ardour is lost in the pursuit of peaceful avocations both by upper and lower classes. Where conscription is in force, no one can shirk military duties, but where service is voluntary the attractions must be such as to ensure that all classes take their proper share in the defence of the country. Apart then from all political consideration, reform is necessary so that the Indian army may remain fitted to take its place in the defence of the Indian Empire, or in support of larger issues which may concern the vital interests of the British Empire as a whole. On these grounds alone, if the premise is accepted that at present the army offers no suitable career for an Indian gentleman, it is argued that measures must be taken to provide for the military education and training of the upper class of each fighting race in India. In order to establish the fact that the Indian gentleman has at present little or no inducement to serve in the army, it will be necessary to review briefly the evolution, present status, and future prospects of the modern native officer.

Previous to the arrival of Clive, no regular native army existed in India. In Madras and Bombay there were a few companies of 'sipahis' commanded by their own countrymen and supplied with European arms and accoutrements. A want of drill, discipline or any form of regularity rendered them of small military value. In Calcutta a few natives had been entertained as 'Buxarries' or 'Barkundaz', but they were even less efficient than the native soldiers in Madras and Bombay. With the marvellous discrimination and foresight which marked his character, and contrary to the universal belief of the time, Clive perceived that under an improved organisation military units of value might be raised out of this somewhat unpromising material. In the year 1756 he commenced to assimilate them, as far as possible, to the European battalions. He organised the native levies at Calcutta into a battalion, appointed an European officer to command, and non-commissioned officers to drill them. Such was the foundation of the original 1st regiment of Bengal Native Infantry, from the constitution of which it can be truly stated that the native army of India has now been developed. Under Clive's organisation there were 10 companies in a battalion with a native Commandant, 10 Subadars, 30 Jemadars and a native Adjutant, while two or three British officers of junior rank were in supreme command. The early success of the scheme may be gathered from the fact that, within 12 years, Clive drew up a native battalion

Evolution of the modern native officer.

to suppress a mutiny in one of the European battalions. From the commencement, however, it was found that the pay and prospects offered to a native officer in the Indian army were not sufficiently brilliant to attract the Indian gentleman, but as most of the men of the class required were depraved and inefficient, it was not considered expedient to improve the terms so as to induce them to enlist. It was, therefore, decided to rely mainly on promotions through the ranks to fill up the commissioned grades. In this manner the old class which had furnished officers for the armies of Native States, prior to the British occupation, ceased to seek for employment in the army, and has now practically disappeared. In 1828, a gentleman of the Honourable the East India Company, while commenting on this state of affairs, wrote:—

“Our armies and civil offices present not a post worthy of the ambition of any but men in utter want.” *

Again before the Indian Mutiny, Sir Henry Lawrence, among many others, pointed out that the hybrid post of native officer in our army could never attract the best class of native gentlemen. Under these conditions, the system of having a large proportion of native officers did not prove successful and the number was reduced, while the proportion of British officers was gradually increased. The conclusion was drawn that the maximum fighting efficiency of a native unit could only be attained under the leadership of British officers. From a close perusal of past history it can be confidently asserted that the inference was justifiable and correct, but it must be admitted that the right class of man had never been attracted to the native commissioned grades, and that no attempts had been made to facilitate the education of men of the class required. Political and military considerations undoubtedly demanded that the higher grades should remain in the hands of British officers alone, as long as the Indian gentleman of the class required was absolutely uneducated and unqualified for the onerous duties of an officer. Prejudice against education militates, even to the present day, against the provision of suitable candidates; among the best fighting classes, Sikhs, Gurkhas, Pathans, etc., etc., the art of letters is still looked upon with disfavour. Popular opinion is, however, changing, and it is probable that the offer of well-paid and fitting appointments will soon create a new class of Indian gentlemen, qualified by education, caste and character for important posts. If the prizes are worth having, doubtless in course of time candidates of suitable merit will be forthcoming.

It has been explained above how, in the first instance, native officers were allotted to a battalion in the same proportion as British officers to an European battalion of the East India Company. For the general supervision and guidance of the corps, two cr

Status and duties of a Native Officer.

* Examination of the Principles and Policy of the Government of British India by a Gentleman of the Honourable the East India Company.

three junior British officers, the senior was a Captain, were added. All executive control naturally tended to fall into the hands of the latter element, and a new grade between the officer and non-commissioned officer was evolved. In the present day there are as many as 14 or 15 British combatant officers in a regiment or battalion. This allows for a British officer to each half-squadron or company, as well as four squadron or double-company commanders, a Quartermaster, Adjutant and Commanding Officer. The necessity for a large proportion of British officers is not due to the requirements of peace time, but to the fact that the Indian army must be prepared to face an European foe in war, when there is danger that, if the number of British officers is small, a corps may be entirely denuded of its leaders after the first battle. In addition to the British officers, there are two native officers to a half-squadron or company, and an additional officer as *Woordie-Major* in most cavalry regiments. Hitherto, the system of commingling British and native officers has worked admirably and has been most successful in bridging the gap, which must exist when the senior officers are of a different race to the men under their command. The combination is a powerful one, and the best possible for a corps of similar constitution. The native officer with his ripe experience and intimate knowledge of the half-squadron or company, for it must be remembered that direct commissions have been the exception hitherto, has proved invaluable in the guidance and assistance of the young British officer both in cantonments and in the field. Most British officers can recollect a word of friendly advice or a note of warning received in the early days of their service from a senior native officer, and can probably testify to the gentlemanly and unassuming manner in which the hint has been given. On parade a native officer in a cavalry regiment commands a troop, and the senior native officer in a company commands the company. In the lines, the native officers are immediately responsible for discipline, cleanliness of men, barracks, etc., and for the general supervision of their units in all minor matters connected with the care and custody of rifles, ammunition and clothing and with horse management, duty rosters, etc. They are responsible for the actual disbursement of pay, but all accounts must be checked by a British officer, who must satisfy himself that the signature or seal of each man is affixed to the acquittance roll as a receipt for payment, and that the men acknowledge the correctness of their accounts to him at a parade where they have a full opportunity of bringing forward any complaints.

While every attempt is made in a corps to maintain the dignity and responsibility of the native officer's position, it is quite clear that his duties are restricted and that a high proportion of British officers tends to cramp and stifle all initiative, both in the field and in cantonments. With whatever care a Commanding Officer may strive to ensure that the British officer does not usurp the rôle and functions of the native officer, the latter is apt to become merely the assistant of the former in all matters connected with drill, discipline

and interior economy. During the last fifteen years the number of British officers has been steadily and persistently raised, and it cannot be denied that each increase must, to a greater or less extent, diminish the responsibilities of the native commissioned grades. Still, it must be admitted that the present native officer as a rule is not qualified either by birth or education to replace the British officer. There is no distinct native officer caste, so that in a squadron or company many close relations of the native officer are found. This is a great disadvantage which would be more pronounced if the present stamp of native officer were in supreme command. Family feuds are often re-enacted in the unit, and family interests are apt to supplant, to a dangerous extent, the interests of the service. On this account it is inadvisable to leave any patronage of promotion in the power of the native officer, although he undoubtedly may have the best knowledge of the true merits of rival claimants. It is even dangerous to ask for his advice on the subject, for it will be found that generally the sowar or sepoy is quite prepared to accept as 'kismet' his own failure to obtain promotion if a British officer makes the recommendation, while he is at once convinced that his chances have been ruined by partiality and favour if he believes that his failure is due to the representations of a native officer.

From the above brief outline of the status and duties of a native officer, it is manifest that an Indian gentleman, who obtains a direct commission, will not find that his duties during peace time offer any pleasing variety or great scope for the exercise of his abilities. He will practically command a half-squadron or company under the supervision of a British officer from the end of his period on probation, as there are only two native officers per half squadron or company, one of whom is often absent on leave or duty. Even though he continues to serve for 30 to 40 years, he will still be doing exactly the same work. The monotony is sufficient to blunt the enthusiasm of the keenest of soldiers, and is a great drawback to the granting of direct commissions, instead of relying on promotion through the ranks for filling the commissioned grades.

For the native officer who has worked his way up through the ranks, the prospect is not so bad. He has obtained his commission after many years of strenuous labour, and is probably quite content if he can rest on his oars, and avoid serious responsibilities or important duties until the day comes when he has earned the superior rate of a native officer's pension.

Pay and prospects of a native officer.

The following table gives the monthly rates of pay and pension for native officers.

		Pay.	Ordinary pension after 21 years' service.	Superior pension after 32 years' service.
		Rs.	Rs.	Rs.
Silladar, Cavalry Regiment.	Jamadar ...	80	15	25
	Ressaidar ...	150	30	50
	Risaldar ...	250	30	50
	Risaldar-Major	350	80	100
Artillery, Infantry, Sappers and Miners.	Jemadar ...	50	15	25
	Subadar ...	100	30	50
	Subadar-Major	150	80	100

The usual class who pass through the ranks rarely obtained a commission before 12 years' service, and 15 to 20 years are the more usual term. Sometimes, in exceptional circumstances, such as in the case of the son of an old native officer, promotion is accelerated. A knowledge of this possibility gives the youth an extra incentive to work, as he feels that he is marked for promotion from the very beginning. It may be noted that no advantage in pay is gained by entering the cavalry, as the additional emoluments are more than swallowed up by the increased expenses of living in a cavalry regiment.

Towards the end of his service a native officer may obtain admission to the Order of British India, of which there is a first and a second class. In the former there are 188 permanent and 17 temporary appointments at the present time. In the latter there are 250 appointments. Admission to the first class carries with it an allowance of Rs. 2 a day in addition to pay and pension and the title of Sardar Bahadur, and to the second class Re. 1 with title of Bahadur.

For gallantry in the field the native officer, in common with other ranks, can obtain admission to the Order of Merit. In this Order there are three classes, in each of which an extra allowance is given varying with rank. The allowance for the third class for the rank in which the act of valour was performed is usually given unless promotion forms an additional reward for the same act, in which case it carries with it the allowance of superior rank. The allowance of one class only can be drawn at a time, and it does not increase on

promotion. Subjoined is a table of the monthly allowance that can be drawn by a native officer.

		1st Class.	2nd Class.	3rd Class.
		Rs.	Rs. a. p.	Rs. a. p.
Silladar, Cavalry	Jemadar ...	14	9 5 4	4 10 8
	Ressaidar ...	36	24 0 0	12 0 0
	Rissaldar ...	60	40 0 0	20 0 0
Infantry, Artillery, Sappers and Miners.	Jemadar ...	17	11 5 4	5 10 8
	Subadar ...	52	34 10 8	17 5 4

Of the first class there are only two members, the last admission having been made in 1859, and of the second class only 12 members. Allowances for this Order are continued until death.

A native officer may also become Aide-de-camp to the Viceroy, Governors of Madras and Bombay, or Commander-in-Chief. There are seven of these appointments, which carry an allowance of Rs. 150 a month, and an unseconded appointment with an allowance of Rs. 50 a month. An Indian gentleman, therefore, who obtains a direct commission, receives at the commencement Rs. 80 or Rs. 50 a month, accordingly as he is enlisted in Silladar Cavalry or Infantry, and will rise to Rs. 250 or Rs. 100 as Risaldar or Subadar. He may become Risaldar Major or Subadar Major, but there can be no certainty of this, as it may just happen that another 'Direct Commission' may enter the service a little before him and block the way. However, with ordinary luck he may expect to rise to the highest posts, when he will retire on the enhanced pension that is given to a Subadar Major after three years' service in that rank.

The increase of pay sanctioned for the Indian army from the 1st January 1909, considerably improved the prospect of native officers, but even now the emoluments cannot, in any wise, be compared with those obtained in the various civil departments of the State. For the class of man who at present enters the service, the pay is sufficiently liberal, but it is not generous enough to attract a better educated class of Indian gentleman, even though a direct commission entitles him, on joining the service, to the full pay of the commissioned grades.

It is trusted that the preceding paragraphs have fully justified the postulate at the beginning of this essay that a career in the Indian army, however attractive it may be, can neither by virtue of its opportunities for the exercise of abilities nor by reason of its emoluments satisfy the ordinary ambition of an Indian gentleman. A few years ago the rule was made that one out of every four commissions should be

a 'direct commission' given to an Indian gentleman without necessarily any previous service. It was hoped that, in this manner, a better class of candidate would be forthcoming and that the tone of the commissioned grades in the army would be raised. On political grounds also it was doubtless considered expedient to offer a career to the sons of Indian gentry. The scheme has not succeeded, and there appears to be little possibility that under existing conditions it can succeed. In the native army itself, the innovation is most unpopular. Commanding officers have been at their wits' ends to know how to comply with the regulations and obtain suitable candidates outside the regiment for one out of every four commissions. The names of many candidates have indeed been submitted by the civil authorities, but, on investigation, few have proved to possess the necessary qualifications of birth, caste and physique. It is of course a recognised principle that owing to considerations of caste and racial prejudices in India, there can be no deviation from the rule that in a class unit the native officer must be of the same class as the men under him, and if he has not risen through the ranks must be a man of good family, for it is only by means of his social position that he will obtain and command the respect of the men. His physique must be sufficiently good to enable him to discharge the duties of a native officer. As the right stamp of gentleman has not been forthcoming, the majority of direct commissions has been given to the sons of old native officers. It is a matter for regret that the sons of native officers are not much better educated than their fathers. Up to a recent date good education was not considered to be a paramount necessity even in the commissioned ranks, so that native officers can be excused for failing to foresee the importance that would be attached to this qualification. In regiments, this system of giving direct commissions to sons of native officers causes a good deal of friction. The existing native officers are so closely connected by class and family ties with the men, that their sons on obtaining a commission find themselves in command of an unit, where uncles, brothers, cousins and other relations are serving among the rank and file. The new arrival is not exactly hailed with delight, for he can be no more popular among the men of a squadron or company than the son of a Colonel would be among the British officers of a battalion, if he were placed in command from the commencement of his career. Promotion to the commissioned grades is hopelessly blocked for perhaps a period of 32 or more years, whereas the outlook is far more promising in the case of a native officer who has risen through the ranks and whose tenure is limited to a short period. The latter only obtains his promotion after many years' service, during which time the hard work in the ranks has probably impaired his constitution, so that there is always a chance, perhaps a hope, that he may become incapacitated by ill-health before completing his maximum service. Moreover, advancement to the commissioned grades through the ranks has been the almost universal rule since the formation of a native army, so that

the rank, pay and pension of a native officer has become the natural ambition of every recruit who joins a regiment. Any system which diminishes the chances of obtaining this plum, as a reward for long and faithful service, must be unpopular. Just as every cadet at Sandhurst or Woolwich pictures himself with a Field Marshal's baton in his pocket, so every native recruit on joining allows his imagination to soar to the *dignitas cum olio* of the native officer. Not every cadet becomes a Field Marshal, but the hope spurs him on until when the fires of youth die down he realises that the baton is not for him, and becomes reconciled with the prospect of a humbler lot. Similarly, a native recruit enshrines a secret hope in his youth that he may one day become a native officer, but ends by being content with a lot less exalted than that of his initial aspirations. If the baton is made the prerogative of princes of the blood royal, or if the rank of native officer is reserved for youths obtaining direct commission, the class of man, who is prepared to struggle through the grades of British officers or through the native ranks must be inevitably lowered.

The 'direct commission' has, therefore, many disadvantages, and the enforcement of any fixed rule as to the number of direct commissions is a grievous error. Officers of any length of service in native regiments have seen instances of successful direct commissions, but a greater proportion of instances where direct commissions have been a failure. The giving of direct commissions is like a venture in the dark. The only judge of the possible success of each venture is the Commanding Officer. He has to take into consideration many factors. Sometimes with the best of intentions he finds that he has made an error. In the first place, much depends upon the character of the man to whom the direct commission is given. This can only be judged after the youth has served for some time in the regiment. In the second place, a great deal depends upon the interest which his family and caste will secure for the candidate in his new position. This can be ascertained by careful enquiry before enlistment. In the third place, attention must be paid to the merit and influence of rival claimants for the position of native officer, who may happen to be serving in the regiment at the time and must be superseded. Under the circumstances, it is considered that it would be advisable to rescind the present rule which lays down a fixed proportion of 'direct commissions' and leave the matter entirely in the hands of Commanding Officers.

At the same time, it is highly desirable that the standard of education of native officers should be gradually raised, so as to qualify them for the requirements of modern warfare, which daily grow more exacting. Even to the present day many native officers are quite uneducated. They can neither read nor write the simplest message. They rely entirely on non-commissioned officers for settling the pay of the men under them; they can neither check half-mounting

Want of education of native officers.

accounts nor peruse the daily orders and elementary drill books. This state of things is most unsatisfactory. A higher standard of education cannot be exacted from the rank and file, until all native officers are well educated. It must be recognised, however, that an educated 'babu' would be entirely out of place as an officer.

The aim must be to induce the fighting classes to educate themselves in the same manner as officers of all other nations and armies are educated. The Japanese officer is highly educated. The men of the Japanese army are rapidly improving. Similarly, in India, when the native officer is highly educated the standard of education in the ranks must improve. The change must be gradual and there must be no attempt to force the pace. For many years, promotion cannot depend entirely on education. No low-caste man can be promoted merely because he is educated. It can only be when there are several candidates of the right class that preference can be given to the best educated man.

To raise the standard at the present time, it is considered that Government can do most by paying special attention to the encouragement of schools in districts whence the fighting classes spring. The soil may not be so fruitful as that of Bengal, and the immediate results not so full of promise, but it is only by this means that the standard of education in the ranks can be raised. Germany has the best State schools and the best army. Japan is following suit. It is a positive fact, though not always recognised, that at the time when a man enters the ranks his brain has passed the most receptive age. Learning is then a great labour to him, unless the brain has been regularly trained from a much earlier period. Only by encouragement of education in the districts, from which our army is recruited, can the standard of the rank and file, and with them that of the native officer, be materially improved.

For the higher training of men likely to become native officers, it is recommended that a Military Training College be instituted at some centre. This college should be modelled on the lines of an elementary Staff College, so far as the question of military subjects is concerned. Both non-commissioned officers who appear to have the makings of native officers and all 'direct commissions' before their probationary period is considered to be complete, should pass through a course so as to gain a qualifying certificate. In the case of the former the acquisition of this certificate should not be a *sine quid non* for the rank of native officer, but should bear the same relation to promotion as, in the case of a British officer, a P.S.C. bears to employment on the Staff. In order to gain entrance into this College, non-commissioned officers should be required to pass a competitive examination, and 'direct commissions,' a qualifying examination. No non-commissioned officer would be permitted to compete unless certified by his Commanding Officer to be fit in every respect for

promotion. The subjects for examination should be chiefly military, but facility in reading and writing in his own language must be indispensable. English should be a voluntary subject, for which extra marks would be given. The course at the College should extend to two years; the Commandant of the College being able to revert to regimental employ men whose progress was unsatisfactory. During his stay at the College, every non-commissioned officer should receive a monthly allowance of Rs. 5, so as to compensate him for the extra work. On completion of the course the non-commissioned officer would return to his regiment in the same grade, but the monthly allowance should be continued to him, as long as he remained in the non-commissioned ranks. In this manner the fact would be recognised that the acquisition of the certificate did not necessarily entail promotion, and no soreness would exist. It is considered that in process of time a course of this nature would materially raise the standard of education in the army, as the advantages of education would be firmly impressed on every recruit. A well-educated body of native officers, which could take its share in assisting to educate the rank and file, would be a great boon to the service.

The above embodies all the suggestions for reform, by which it is recommended that the present system shall be modified in the majority of regiments. **Reform of present system.** Apart from an endeavour to raise the standard of education of the ranks and of the native officers, by a liberal grant of State-aided schools in their own districts and by means of the institution of a Military Training College for the higher education of men who are likely to become native officers, no further innovations are proposed. The promiscuous granting of direct commissions is strongly deprecated, and no extension of the present system of direct commissions, as opposed to promotion through the ranks, can be recommended. The system is unpopular, and has completely failed in its object.

It is evident, however, that small measures of the description given can neither satisfy the aspirations of Indian gentlemen, nor do they mark any real progress towards much needed reform. **Further measures considered.**

The opinion has often been advanced that the higher posts in the army, as well as in the civil services, should be opened to natives of India. In the Indian Civil Service many important and lucrative posts are now held by Indian gentlemen: the tendency is to increase the number. In the army no real step was taken in this direction until the late Viceroy instituted the Imperial Cadet College at Dehra Dun for the training of Indian youths in military duties. There are vacancies for 24 cadets, but so far this number has never been complete. At the end of the course, successful cadets are posted as 2nd-Lieutenants in the so-called Native Indian Land Forces. Commissions have been granted to eight Indian gentlemen,

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of whom three are now Aides-de-Camp, two are serving with Imperial Service Troops, one is in the Division of the Chief of the Staff at Army Head Quarters, one is posted to a Camel Corps, one has been attached, as an experiment, to a battalion of native infantry and one is unemployed. Some reform is urgently necessary, and

the following extract from a letter written by Colonel Alexander Gardiner, the military adventurer, who served so long under the Sikh durbar, from his place of retirement in Kashmir on the 22nd July 1876, is of interest as it gives the opinion of a man, who had an exceptional opportunity for the close study of native character.

"A few, plain, simple, brotherly words from John Bull of India to his much beloved Aryan brother, the Right Honorable Sir John Bull of England."

"You well know, dear John, our loyalty to the Throne, how often we have fought and freely spilt our best blood in your cause, not only in India, but in Egypt, in China, in Persia, in Burma, and in other lands; and in return you surely will not think it too much if we ask you to bestow on us three small favours.

"The first

"Secondly, we earnestly request you to open for our preferment the door so long closed and to give us access to the higher grades in the civil and military services. My dear John, it is more folly, an unwise and unworthy subterfuge, to say, or affect to believe, that we have not clever and trustworthy gentlemen of high rank and proved respectability, fully capable of acting as Deputy Commissioners, Residents, or even Lieutenant-Governors, as well as Captains, Majors, Colonels, and Generals in the army. I can assure you that we have many scions of noble and princely birth, who, with a fair meed of encouragement, would soon qualify themselves for, and would prove a credit to, your civil and military service.

"My dear John, you often say that you have won India by the sword; but I beg to assure you that if you grant us these three requests you will fairly and completely win the heart of your three hundred million, more or less, of Indian subjects.

"As to the native army, I beg to assure you that you possess as good material as can be found in any part of the world; but I would suggest that clan corps, or clan divisions, would be the best system that you could adopt. For instance, a Rajput, a Gurkha, an Oudhe, an Afghan, or a Sikh division of well-chosen men organised to suit their own national ideas (not yours), and commanded by officers of their own clan or race, would prove not only loyal to you, but of the highest value in every respect. I assure you that such officers, chosen from the chiefs and nobles of the land, would not only be held to loyalty by their high birth, high caste, rank and family pride, but would by them be stimulated to a noble ardour and desire to distinguish themselves in the field as brave soldiers."

The writer of the foregoing was a man who knew native character intimately, and one who had served on many battlefields both in Afghanistan and India. He was well aware that Ranjit Singh entertained in his army several French and Italian officers, who organised the troops, improved the artillery, and generally superintended their drill and discipline. These officers were not, however, entrusted with supreme command in the field, and in the Sikh wars against the British, there was only one European officer, Colonel Hurbon, serving in the field. It is not considered that it would have been politic, at the time of Colonel Gardiner's letter, to carry out his suggestions, but it is believed that the time has arrived when some advance should be made in this direction. The change must be very gradual, and its success will depend, in a great measure, upon the method of its initiation.

It is not possible to remain satisfied any longer with the idea that native gentlemen never can be qualified to lead their own countrymen against an army trained on modern lines. Before the late Russo-Japanese war few Europeans believed in the possibility of the complete success of the Japanese both by sea and land. Any one suggesting the idea was derided. Still our numerous campaigns should have taught us that in India, at any rate, military genius is not unknown. The Mahratta, Gwalior, Nepalese, Sikh and Frontier campaigns furnish, to impartial observers, many proofs of innate military skill in the Indian leader. In Scindia's army and in the Sikh army were numerous officers holding commands as Generals and Colonels, who had been trained in our own service, and who showed us at Maharajpur and on the Sutlej how well they could train and lead others against us. In some respects the aptitude of natives for affairs military is greater perhaps than ours: many are born warriors, and have a natural eye for the tactical value of country. It is not necessary to search the records of ancient history to illustrate the point. Can we not admire the strategical counterstroke of Ayub Khan at Maiwand, and the military genius which enabled him to transport his large force across the arid country between the province of Farah and the Helmund, or the skill with which he screened his movements so that a weak force was detached from Kandahar to oppose him, under the impression that the main body of the enemy had never left Herat? Can we ignore the masterly tactics of the Afridi general who completely outwitted and outmanœuvred a Brigade commander on the Samana in 1897, and induced him, by a skilful feint at Hangu, to withdraw his whole brigade from the top of the Samana ridge until it was too late to return to the relief of hard-pressed Saragarhi? But for the obstinacy and skilful defence of the 36th Sikhs under a gallant commander, Gulistan with its imperfect fortifications would also have fallen to the determined assaults of enormously superior numbers. Can we be blind to the tactical skill which selected the almost impregnable flank position at Dargai, in place of occupying a position across the line of advance of the host

**Capacity of Native
Leaders for higher
command.**

invading Tirah ? Instances can be multiplied *ad infinitum*, and we may be quite sure that, given the opportunity, the Gurkha, Sikh, Dogra, Rajput and Khattak, would prove just as capable leaders of men as the Afridi and Afghan. It must always be remembered that superior organisation, plentiful resources and unity of purpose are often as indispensable adjuncts to victory as tactical skill and bravery in the field. In the hard fought contests of the Sikh wars it is impossible to forget the jealousies of rival leaders, the want of support of the Sikh Durbar and the lack of organisation, which seriously hampered the Sikh generals. Notwithstanding all this, victory in more than one battle lay for a long time in the balance. It is a common failing of casual critics that they are apt to pat their own Generals on the back, and to admire the skill and bravery of their own troops, but they quite ignore the reverse side of the medal. Every decoration we award, every commendation we bestow is a direct tribute to the military qualities of the army that opposed us. If an enemy exhibits no bravery and no skill, little bravery or skill can be requisite for his defeat. By giving credit to our troops we belaud the enemy ; by admiring the skilful dispositions of our own Generals, we acknowledge the merit of the leaders of the enemy, whose dispositions were such as to evoke the necessity for an exhibition of gallantry or science. If we peruse carefully the despatches of our many Indian campaigns and judge the qualities of native leaders by this standard, we must admit that native gentlemen of the fighting races, given the opportunities of education and of military training, are fully capable of officering the higher grades in the Indian army. Imperial Service troops are already completely officered by Indian gentlemen ; their possible value in the field was sufficiently indicated in 1897. The question of expediency is then the sole matter for decision.

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In the sepoy war of 1857 the native battalions, deprived of their British leaders, at once lost the bonds of cohesion. The native officers quarrelled among one another, and each individually endeavoured to assert his own authority. The ties of discipline were relaxed, and the great motive power of a common cause was fundamentally impaired. The presence of alien officers in native corps is an important safeguard, for not only is it easier to detect the seeds of incipient mutiny, thus compelling the mutineers, as in 1857, to show their hands before the plot is adequately matured, but the withdrawal of the power that holds the reins at a moment of crisis must diminish the value of the fighting machine, and minimise the chances of success of revolutionary measures. Has the time then arrived for relinquishing this safeguard ? Certainly not. There is little doubt that there will be practical unanimity in the answer to this question. There is, however, no necessity to jump from one extreme to another. The experiment of giving greater responsibility and more important posts can at first be tried in a small fraction of the regular army ;

**Expediency of giving
higher commands to
native gentlemen.**

subsequent development or extension will depend on circumstances. If judiciously instituted and carefully watched a small measure of this sort will entail no grave danger.

Before the limits and reservations under which the scheme is recommended are discussed, it will be advisable to review briefly the various methods of officering the local armies of British and French dependencies, and to decide on a system that appears to be suitable for the proposed experiment.

INDIAN ARMY.

In the Indian Army there is a uniform system which has been explained above, although the degree of control exercised by British officers and the extent of responsibility possessed by native officers vary in corps where there are only three or four British officers as in the Irregular Frontier Militia, and in the highly organised corps where there are as many as 14 or 15 British officers. In the Imperial Service Troops there is the anomaly of two classes of Indian officers: a superior class which occupies the position of British officers in an Indian regiment, and a second class which holds the rank of Subadars and Jemadars.

KING'S AFRICAN RIFLES.

In East Africa there are five battalions of King's African Rifles formed for the protection of British Central Africa, British East Africa, British Somaliland and the Uganda Protectorate. At first when these corps were raised an attempt was made to model them on the Indian system, by the appointment of native officers. It did not prove a success, and at the present time the officers, except in the Sudanese battalion, are all British, the non-commissioned officers being native.

WEST AFRICAN FRONTIER FORCE.

In West Africa there is the West African Frontier Force, which numbers 8,500 men and comprises the military forces of the colonies of Sierra Leone, The Gold Coast, Lagos, Gambia and the Protectorates of Northern and Southern Nigeria. All the officers, and a certain number of non-commissioned officers, are British.

There are also two battalions of the West India Regiment stationed at Sierra Leone and Jamaica. They have as many British officers as are posted to a British regiment, as well as a proportion of British non-commissioned officers.

EGYPTIAN ARMY.

In Egypt there are again different systems. Five Egyptian battalions are commanded by British officers, and four battalions are commanded and officered throughout by Egyptian officers. There are also seven Sudanese battalions commanded by British officers. As the method of officering the battalions differs entirely from all

other British systems, a detailed list of the various grades is given below :—

Egyptian Battalion commanded by an Egyptian officer.	Egyptian Battalion commanded by a British officer.	Sudanese Battalion commanded by a British officer.
1 Kaimakam (Lt.-Colonel) ...	1 Commandant British)	1 Commandant (Brit).
2 Bimbashieh (Major) ...	3 Bimbashieh (British)	4 Bimbashieh (British)
1 Saghkolaghassi (Adjt.) ...	1 Bimbashi ...	1 Saghkolaghassi.
6 Yusbashieh (Captain) ...	1 Saghkolaghassi	8 Yusbashieh
6 Mulazemin Awal (Lt.) ...	6 Yusbashieh ...	8 Mulazemin Awal.
10 Mulazemin Tawani (2nd- Lieutenant).	6 Mulazemin Awal 10 Mulazemin Tawani	13 Mulazemin Tawani.

Similarly, there are mountain batteries, two squadrons of Egyptian cavalry, one squadron of Sudanese cavalry, commanded by British officers and two squadrons of Egyptian cavalry commanded by Egyptian officers. The system of officering the units of the Egyptian army differs from that in the Indian army, in so much that officers, British or Egyptian, are allotted to corps under the same method and in the same proportion as in a British unit, but it will be noted that under no circumstances does a British officer hold inferior rank to an Egyptian or Sudanese officer in his own battalion.

The Egyptian officers, especially in the cavalry and artillery, have proved to be intelligent and well-educated, hard working and conscientious. They do a great deal of the Staff work in the Egyptian army, and during the Dongola expedition the cavalry officers did some dashing patrol work. In 1903, when Mahon Bey (now Major-General Mahon) was starting on a difficult expedition in Kordofan, he especially applied for the services of an Egyptian squadron under a certain Egyptian commander.

FRENCH COLONIAL TROOPS.

The French have a considerable number of colonial troops in different parts of the world, but so far have not attempted to give the natives such responsible posts as are given in the British army. In Indo-China, East and West Africa, there are nearly 40,000 native troops, but the officers are practically all Europeans, half the non-commissioned officers also being French. The usual constitution for a native company of 150-170 privates, being a captain, 2 subalterns and all the senior non-commissioned officers, European, while there are one subaltern, 4 Sergeants and 12 Lance-Corporals, native.

In Africa and Tunisia there are about 26,000 native troops, but all the senior officers and the important portion of the non-commissioned officers are French, half the subalterns and half the non-commissioned officers only being natives. In Tunisia there are also the Beylical troops, which number about 600 men, commanded by 32 native officers, but they are of little use as a military force.

From the French, therefore, it is quite evident that little is to be learnt in the matter of improving the position of native officers.

Although the Tirailleurs, or Turcos, from Algeria distinguished themselves greatly in the war of 1870, still to this day it has not been considered advisable to increase the proportion of native officers or non-commissioned officers, or to give them greater responsibilities. Under French officers and a proportion of French non-commissioned officers, they are always cheery, willing and brave, and are the best marchers imaginable, but the experiment of placing them under their own officers has not in reality been attempted.

A consideration of the French colonial troops and the different armies of the British Empire, shows a marked variety in the system of officering native corps. From the rigid control in a West Indian Battalion, which is supervised by a full complement of British officers and a proportion of British non-commissioned officers, we pass through various grades of tutelage until we find complete emancipation in the Imperial Service battalions with no European officers and a mixed system of native officers, or in the four Egyptian battalions with a full complement of Egyptian officers on an European pattern. If then a wider career in the army is to be given to the Indian officer, on what pattern should the reform be modelled? There is little doubt that a great variety in system is needed, in order to suit the diversities of character and temperament in different races in the world. A model which may suit the Spahis of Algeria will not suit the Tirailleurs of Tonking, and a system which may suit the Sudanese of the Upper Nile can probably not be adopted to the Gurkhas of Nepal. On one point, however, all French and British systems are agreed; Europeans can never serve directly under men of an alien race. To expect it would be absurd. Between officers of a corps there must exist the most intimate relations and the closest *camaraderie*. Where officers do not pull together, the efficiency of the corps will suffer. Between British and Indian, such intimacy is rarely possible. No excuse for the fact is necessary, nor can it be attributed to the narrow-mindedness of British insularity. Would it be possible to have an admixture of British and French, or British and German, or German and French officers in one battalion? The Indian himself is even more exclusive. Muhammadan and Hindu, Gurkha and Madrassi find interchange of social and other amenities equally impossible. Even sections of one class cannot exist together. Manjha and Malwa Sikhs in one corps are often as distant to one another as Hindus and Muhammadans.

The British officer could not serve directly under any foreigner; to do so would be contrary to his spirit and tradition. The British spirit of martial superiority must be fostered and encouraged by every means in our power. A cardinal principle of all reform must, therefore, be that British officers are never placed in direct subordination to Indian gentlemen. Still, it is considered that the time is ripe for admitting Indian gentlemen by degrees to the higher ranks of the Indian army; it only remains to select a system by which this

can be done without violating fundamental principles. In the Egyptian battalions we have two examples by which Egyptian officers are admitted to the higher ranks, without placing them in direct command of British officers. In the first method the senior officers are British, but Egyptian officers are graded from Major to Lieutenant. In the second method all the officers are Egyptian and take precedence from Lieut.-Colonel downwards to 2nd-Lieutenant.

If the experiment of similarly advancing Indian gentlemen to the higher grades is to be given a fair trial, the second method appears the sounder. By degrees the native officers should be entirely emancipated from the leading strings of a British officer. If one British officer is left in supreme command, the prestige and influence of all the native officers must suffer. It would be better if the experiment could be started simultaneously with reorganization of Battalions or with the raising of new units. In this way, it would be possible to avoid the friction which must occur when a new system is grafted on to an old system. This, however, is not practicable at the present time, so that a selection must be made of certain regiments and battalions which can be handed over in course of time to the sole control of officers of their own class. The units selected for the experiment must be class units, as opposed to class squadron or class company units, for Indian officers can only be posted to units in which there is no diversity of races. At the commencement, two cavalry regiments and four infantry battalions might be chosen from among class units composed of some of the best fighting material in India, Sikh, Rajput, Dogra, Punjabi Muhammadan and Khattak. Where class regiments do not already exist, they can be created by an exchange of squadrons or companies. It will be noted that Gurkhas and trans-border Pathans are not included in the scheme. The British Government is not under the same obligation with regard to classes which do not belong to British India, so that the experiment can safely be started with the other classes. If this proves successful, an extension can be made later if thought desirable.

The method of introduction of the new system requires consideration. It has been recommended above

Introduction of proposed reform.

that native officers should be allotted to a regiment or battalion in the same proportion as in an Egyptian battalion commanded entirely by an Egyptian officer, i.e., on the system of a British battalion. The Imperial Service system of having two classes of native officers is not recommended as, for interior economy, drill or field service, the Egyptian system is far preferable. The Indian gentleman should, therefore, receive a commission as 2nd-Lieutenant and rise through the usual grades in a corps to Colonel. As soon as a unit has been allotted for a trial of the new system, no further promotions to the old grade of native officer should be made. This will cause a certain amount of discontent among the sepoys and non-commissioned officers, who happen to be hoping some day for promotion to the commissioned

ranks. To mitigate this, the option of transfer to other units should be given to all men serving, and as early warning as possible of the impending change should be published. The transition from the old to the new system must be extremely slow. As officers under the system are appointed to a unit, they should be attached to a company directly under a British officer, the old native officers, still retaining command of certain squadrons or companies. As by degrees the old native officers retire on pension, the new native officers will be gradually rising to more important posts in the unit, so that at the time of retirement of the last old native officer, every squadron or company should be under the command of an Indian captain. At the same time no junior British officers would have been appointed to the unit, and the British officers would have been growing more senior and gradually becoming less in number. In the course of 20 to 30 years the corps would be entirely handed over to the command of native officers, provided that Indian gentlemen had proved their trustworthiness and ability to command. Under the above method two important rules could easily be observed.

1. That no British officer ever served under an Indian officer.
2. That the new and old native officers did not clash.

The question next arises as to how candidates should be

Indian Sandhurst.

obtained for the new class of Indian officer. An Imperial Cadet College has already been instituted, and the course there is modelled somewhat on the lines of the Royal Military College at Sandhurst. This would form the best channel for training youths for the service. If all the 24 vacancies could be utilised for genuine candidates for commissions, it would be unnecessary to enlarge the College at present. Admission to the College should be obtained by competition or selection after a qualifying examination, the standard of which must at first be low. All competitors must be of the class required for the officering of the several units. If able to pass the competitive examination, there is no reason why the son of an old native officer or even of a non-commissioned officer should not be admitted, provided that his class were suitable. Fees should be taken from all cadets, as in the case of the English institutions at Woolwich and Sandhurst. This will ensure a good class entering, nominations with reduced fees being granted to the sons of old soldiers. The age for entrance to the College should be between 16 and 20 years, and the course should last two years. If there are 24 cadets, this will admit of two officers being posted annually to each of the six units selected, and meet immediate requirements. The full complement of 30 Indian officers in a battalion would thus be reached in 15 to 25 years. At the end of the course there should be a passing out examination before cadets are posted as 2nd-Lieutenants.

It might be suggested that it would be advisable to send all the candidates through the course at Sandhurst and compel them to compete in England as is done in the case of the Indian Civil Service. This, however, is not recommended. If the scheme is to

be a success, no attempt should be made to Europeanise the Indian officer, or to alter his national characteristics. The course at Sandhurst undoubtedly would provide the best military training, but a trip to, or prolonged stay in, England has not as a rule produced good results. In all probability a better class of native gentlemen would be forthcoming for the Indian Civil Service, if simultaneous examinations were arranged in England and India. Of course a visit to Europe, or education in Europe, must never be a bar to employment, but neither should be encouraged.

With regard to emoluments for the new stamp of Indian officer, it is quite clear that these must be liberal,

Pay.

although it is not necessary to give as high pay to Indian as to British gentlemen. The reasons for this are obvious. The former have not the same expenses when taking leave of absence during the hot season, proceeding on furlough, or educating their children. Their standard of living is not so high. The pay must, however, be liberal, as good pay is a great safeguard against dishonesty and corruption, and also a means of ensuring good service. The following rates of pay are suggested:—

			Infantry. Cavalry.	
			Rs.	Rs.
2nd-Lieutenant	...	...	150	250
Lieutenant	...	...	200	300
Captain	...	...	350	450
Major	...	...	600	750
Lieutenant-Colonel	...	...	1,000	1,150

These rates of pay will bring the cost of officers in an infantry battalion to about Rs. 8,000 a month, and in a cavalry regiment to about Rs. 12,200 a month, being a saving of several thousand rupees monthly in each case, on the present salaries of British and native officers combined. Promotion should be given as in a British regiment on the occurrence of vacancies, and not, as in the Indian Staff Corps, after a fixed term of years. Pensions should be given as in the Indian Staff Corps, the first pension being earned after 20 years. A pension of Rs. 150 a month, rising to Rs. 500 a month at the end of 32 years' service, is suggested.

A great difficulty in opening the higher ranks to Indian gentlemen is created by the question of relative rank of British and Indian officers. In the unit itself, where all the officers will eventually be Indian, this friction will not arise. On duties, however, where Indian officers meet British officers of a lower rank great tact and restraint will be necessary on both sides. To a great extent this difficulty has been overcome in the Egyptian army, and there is little reason why a similar solution should not be found in India. With a little management, Staff Officers should be able to arrange that occasions for friction are reduced to a minimum. It should be no more difficult to pay the recognised courtesies of the service to Indian gentlemen, than to Japanese or other foreign officers.

As battalions and regiments are gradually organised, it will be possible to consider whether, in the future, the system may not be extended to Brigades, or even Divisions, officered by Indian gentlemen and complete with their own staff. If self contained units of the separate systems are organised, British and Indian officers of the higher ranks will never serve directly under each other, but by holding collateral rank in separate units should find it far less difficult to get on with each other than was found in China, where officers of all nationalities were constantly meeting. While the new system is being developed, there will have been no tampering with the efficiency of the greater part of our Indian army, as would undoubtedly occur if Indian officers were posted to the same units as British officers. The development of the system can be retarded or extended in accordance with the success or failure of the experiment.

Finally comes the question as to whether it is possible to provide a wider career for the native officer outside the army. It is considered that little of practical value can be done in this respect. Aristotle, in his description of an ideal State, advised that the early manhood of burghers should be spent on military duties; when they came to middle life, they should be eligible for political duties; in their old age they should act as priests. To a certain extent, political duties might be found for native officers, but the field is limited. Doubtless a well-educated Indian officer of the new type would prove most useful as British Agent at Kabul, Herat, Kandahar or elsewhere. They might even be employed as Military Attachés or Military Secretaries to Rajas of Native States. On retirement, the native officers of the old type should be encouraged to take an active interest in district affairs and to serve as chairman of village unions or 'panchayats,' on Taluk Boards, District Boards, Municipal Boards, etc., while the Indian officers of the new stamp should find employment on Provincial Councils, agricultural associations, and as Honorary Magistrates. It is feared that the priesthood will not obtain many recruits from the ranks of old native officers.

The suggestions may, therefore, be briefly summarised as follows:—

1. No change is recommended in the system of filling the native commissioned grades in the majority of regiments. Direct commissions to be given sparingly at the discretion of Commanding Officers.
2. A Training College for the higher education of the rising non-commissioned officer and 'direct commission' to be instituted.
3. Certain units in the Indian army to be officered entirely by Indian gentlemen on the model of a British corps.
4. The Imperial Cadet Corps to provide candidates.

The above proposals do not involve any sudden change at present in the method of officering the majority of regiments in the Indian army, but it is clear

Conclusion.

that the suggestion for handing over the entire control of six units to Indian gentlemen admits of indefinite expansion, the wisdom of which can only be determined by the experiences of the future. Many will be inclined to doubt whether the necessity has yet arisen for the initiation of such a radical reform. It seems impossible to be blind to the signs of the times. While the higher posts in other branches of Government service are being opened more and more to the natives of India, the higher grades of the army cannot remain closed much longer to Indian born gentlemen of the fighting classes, and it is not to the interests of the Indian or British empire that they should be indefinitely withheld. How deep-seated already is the idea that Indians must obtain higher rank in the army, may be gathered from the following translation of a letter to the Editor of the new Indian Army newspaper, the *Fauji Akhbar*. The letter is published in the sixth weekly issue of the paper and purports to be written by a native correspondent in the native cavalry.

"Many people think that natives should receive promotion to the high posts in the Government army. This idea is quite correct, and it is hoped that Government will soon devote its attention to the matter, but this point must also be considered. How many natives are found in the army of to-day who are qualified to take the places of British officers? When we express a desire to obtain the high posts in the army, it is our duty to see that we fit ourselves for those appointments. It is as essential for Native as for British officers to study tactics and art of war.

It is a significant sign that this ambition among natives in the army should have been definitely voiced in an officially recognised newspaper within six weeks of the first issue. It is also encouraging to observe that the writer is reasonable enough to realise that the want of education on the part of native officers is still a serious obstacle to their advancement. There is little doubt, however, that many Indian gentlemen of the right class will soon be sufficiently educated to replace British officers. It is the duty of Government to encourage their reasonable aspirations, and to give such assistance as may be consistent with prudence and the dictates of common sense. The greatest safeguard against the abuse of the suggested innovation lies in education, which is rapidly teaching the sanest and best-balanced minds among natives in India that, in these days of armed populations and perfected communications, the very existence of nations depends on confederacies which yearly grow larger. An India, separated from the British Empire, even though it could survive the shock of internal dissensions, must inevitably fall a prey to one of the large neighbouring powers. Who can say which? Russia, China or Japan? The theory is often advanced that if all British control could suddenly be withdrawn from India, the reins of Government would once more be seized by a Muham-

madan dynasty. Temporarily they might be, but no educated Muhammadan seriously believes that neighbouring powers would neglect to seize a rich bait like India long before it had time to recover from the effects of disunion and to consolidate itself under a new *régime*. In any case the duty of England in India is clear. The masses must be educated to realise—just as the cleverest brains in India already realise—that the existence of India depends on its position in the British Empire. At the same time, England must recollect that certain forms of union are so oppressive, that a disruption of the bonds is preferable even at the loss of all dependence. Our efforts must, therefore, be directed to knitting the ties which bind the countries together, not with rivets of steel, but with the firmer bonds of mutual interests. We must look forward with sincerity and loyalty of purpose to a distant day, when a new India will be handed over, regenerated and united after a masterful tuition through a well-directed youth, to the guidance of its own people. Such alone can be a goal worthy of the best efforts of the English race, such alone is the goal that will ensure the stability of peace in the Indian Empire and permit the present *régime* to work to its logical end. In the army, as in the Civil Service, the seeds of our purpose must be sown and the correct lines of approach to the ideal must be appreciated from the commencement. The ultimate necessity for army reform is clearly a matter of political, as well as of military, expediency, and in conclusion we must recollect that we are bound by the solemn assurances given in 1858:—

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and it is Our further will, that, so far as may be, Our subjects, of whatever race or creed, be freely and impartially admitted to offices in Our service, the duties of which they may be qualified by their education, ability and integrity duly to discharge."

UNITED SERVICE INSTITUTION OF INDIA GOLD
MEDAL ESSAYS, 1909.

THIRD ESSAY (Commended).

BY MAJOR C. H. CLAY, 28th GURKHA RIFLES.

MOTTO :—“*The Spirit of an Army is in its Officers.*”

I.—INTRODUCTION.

Before proceeding to consider the future of the Native Officer it will be necessary to discuss briefly his present position, the method of appointment to the rank he holds, and the prospects that are now held out to him. From this may be gathered the nature of the man with whom we have to deal; his capabilities and limitations; and, to some extent, his fitness for a wider career than is at present open to him in His Majesty's Indian Army.

The subject is a difficult one. It must be regarded from many different points of view, and the military and political possibilities of any change in our present system must be carefully weighed.

Were it possible to approach the problem from a purely military standpoint, without regard to race distinctions, caste prejudices, the seditious movement in India, and so on, the task would be a comparatively easy one.

As it is, however, it will be found that every proposal that can be put forward for the betterment of the position and prospects of the Native Officer has certain objections; in some cases so grave as to render the particular scheme put forward obviously impossible; in others, however, capable of being overcome should it be ruled that the importance of opening out a wider career to the Native Officers is sufficient to warrant the acceptance of certain risks, and of a certain loss of military efficiency. It is often urged that we commit a grave political blunder in not opening a wider military career to the scions of the princely houses and landed gentry of India; that the absence of any scope for their ambitions and martial ardour tends to make them restless and discontented, and at the same time deprives the Empire of the services of valuable soldiers. There is, doubtless, considerable truth in this contention, and it is proposed in the course of this Essay to consider, not only the future of the Native Officer as at present existing, but whether it would be possible to open out a military career for men of good family by some modification of the present system of appointing Native Officers.

At present a certain number of direct commissions are given to men of this class, but the system is not altogether a satisfactory one and its extension cannot be advocated. To use this system in

order to enlarge the scope of military employment for Indians would, as will be shown later on, entail very serious disadvantages, and would injuriously affect the prospects of men aspiring to obtain their commissions through the ranks.

The latter are, undoubtedly, the backbone of the Indian Army, and it is even more important to encourage them than to attract the class who aspire to direct commissions.

As promotion goes at present, however, the Native Officer who rises from the ranks is, usually, too old and too uneducated to be fit for further advancement.

To avoid this objection a proposal will be put forward to establish a School of Instruction for promising young sepoy and non-commissioned officers, so as to enable them to be pushed on rapidly to the rank of Jemadar, with a view to their eventual posting to special Corps in which all the Officers would, in due course, be Indians, thus affording them the opportunity of ultimately rising to the position of Commandant.

With such a system in force the man of good position, who now strives for a direct commission, could afford to enter the ranks in the hope of obtaining speedy advancement.

Thus both classes of men would be equally benefited; the level of education throughout the Indian Army would be raised; and we should no longer be open to the reproach that an Indian subject cannot hope to rise in the Indian Army as the celebrated General Alikanof was allowed to rise in the Russian Army.

It will, of course, be necessary to proceed slowly and cautiously in the direction indicated, but the prospect of higher things can hardly fail to incite our future Native Officers to still greater exertions, and as we raise their standard of efficiency we raise that of the whole military machine, for it should never be forgotten in dealing with troops, that—

“The Spirit of an Army is in its Officers.”

II—THE NATIVE OFFICER AS HE EXISTS TO-DAY.

The present day Native Officer has attained his position in one of two ways—by promotion from the ranks, or by direct commission. The numbers of the latter are comparatively so small that they may, for the present, be left out of consideration. As regards the former every man has entered the ranks as a recruit, and has worked his way up through the various non-commissioned grades to the proud position of Native Officer. Some have attained to this rank quicker than others; promotion in the lower grades is, usually, a matter of seniority tempered by selection; provided a N.-C. O. fulfils the conditions laid down for promotion to a higher grade, it is difficult to keep him back even though a more brilliant man may be next below him on the list. The consequence of this is that promotion is somewhat slow, and it may be anything from fifteen to twenty years before even a particularly able man can rise to the rank of Jemadar. He then has to wait several years more before he can hope to become

a Subadar, after which the honourable and responsible position of Subadar-Major is the only military prize open to him. The pensions are, however, distinctly good for men in the position of Native Officers, and by the time they are due most of them are quite ready to take them and retire to their homes to enjoy their well-earned repose. During a long period of years this class of Native Officer has done good and faithful service to the State and has undoubtedly proved the backbone of the Indian Army. Thoroughly in touch with their men, living amongst them, sprung from their ranks, and still, when off duty, on intimate terms with them, they form a link between the British Officers and the rank and file which ensures, on the one hand, the best work being got out of the men, and, on the other, a due regard for native feelings and prejudices. Gallant leaders of men, and often capable of handling their companies with marked tactical skill, the Native Officer has shown his worth on many a stricken field, and not a few British Officers hold that, given wider scope for his abilities and a more scientific training, he could be trusted in yet more responsible positions. But good as he undoubtedly is in his present position, the Native Officer suffers from disabilities of education and training that must necessarily militate against his promotion to the higher ranks of the Army. The majority of them enter the Army at an early age, with little or no education; the long period of service they have to pass in ranks and as N.-C. Os. while imbuing them with the sense of discipline, the importance of routine, and thoroughly grounding them in the minor details of their profession, tends to narrow their outlook and unfit them for a wider career; while the want of any system of higher military training, and the age at which they attain commissioned rank both tend to discourage the belief that the present day Native Officer could be usefully employed in higher positions. Still it must be remembered that the position of Native Officer, though it may seem to us a comparatively humble one, is to the native recruit what the Marshal's baton is to the French soldier. The prospect of one day becoming a Native Officer is the lure that attracts most of our best recruits, and anything that tends to reduce this prospect, such as a free bestowal of direct commissions, or the institution of an Indian Sandhurst, cannot fail to have the most pernicious influence on recruiting. It is necessary to insist most strongly on this point of view, for if a wider career is to be opened to Native Officers they must be educated up to their new responsibilities. In any position superior to that of Subadar, for instance, a thorough knowledge of English would be essential. We must regard the Army as a whole. British troops fight alongside native regiments, constant inter-communication is necessary, and English is the only possible medium. It is easy to see, therefore, that in our desire to afford more opportunities to Native Officers we may easily be led to require such additional accomplishments from them that the average fighting man who now supplies the bulk of our Native Officers will be entirely crowded out. As it is, the increased educational qualifications now demanded from

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N. Os. and N.-C. Os. tend to debar from promotion many a sepoy who is thoroughly satisfactory in all other respects. There are of course exceptions to every rule, and amongst the Native Officers of the Indian Army there are doubtless a considerable number of men qualified in every way to rise to higher rank than they have, at present, any prospect of. As regards the great majority, however, it may safely be said that, though perfectly fitted for their present responsibilities, they have neither the qualities nor the aspiration for a wider career.

III.—DIRECT COMMISSIONS.

The system of granting direct commissions in the Army to young men of good family and liberal education has been tried to a limited extent, and it is as yet difficult to say whether the system, judged on its merits, is a success or not. On the one hand, it should, undoubtedly, provide a more intelligent and highly educated class of Native Officer. On the other, the men so obtained have not had the advantage of the strict discipline and careful training given in the ranks, and are not so bound up with the life of the regiment as is the case with promotions from the ranks. The system of direct commission has, moreover, the obvious disadvantage that the older men promoted from the ranks find themselves superseded by men much younger than themselves, and this cannot fail to lead to jealousy and heart-burning. Every direct commission means, too, that one appointment to Native Officer is lost to the N.-C. Os., who have borne the burden and heat of the day, and this, as has already been pointed out, is bound to react unfavourably on recruiting. Used very judiciously, as a reward for faithful military services on the part of a near relation, the sparing grant of a few direct commissions can be defended, but to introduce the system on a large scale would be most injudicious unless a radical change is contemplated in the organisation of the Native Army. The two systems cannot be expected to work satisfactorily in the same unit, though by limiting direct commissions to certain corps, and having all the Native Officers in them men with direct commissions it would be possible to avoid the difficulty of supersession. Here again we are met with the fresh difficulty that promotion from the ranks being barred, no good man would enlist in these particular corps.

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Again, if direct commissions were to become the rule instead of the exception, it would become necessary to institute some preliminary system of training for the candidates, in order to give them a fair start and fit them for the higher duties of their profession. An Indian Sandhurst, through which candidates for direct commissions would have to pass, would, at first blush, seem a simple way of affording this training, but when we consider that parallel institutions on the civil side tend to become hotbeds of sedition and disloyalty, we may well hesitate before venturing to expose our future Native Officers to similar influences.

IV.—SCOPE OF EMPLOYMENT OF NATIVE OFFICERS.

The present scope of employment of the Native Officer is strictly limited to the command of a company and to the appointment of Subadar-Major. Such a limited career may, and probably does, meet all the aspirations of the average Native Officer who has attained his rank under the present conditions of service, but it is impossible to assert that it holds out any suitable attractions to men of good family, nurtured on warlike traditions and brim-full of martial instincts. Such men would naturally aspire to rise higher in the service than the command of a company, and in order to attract them, should it be considered necessary to do so, far higher inducements would have to be offered. They would in short have to be placed on a par with British Officers as regards promotion and the prospects of advancement. The command of a regiment would have to be the prize to attract the many, the chance of even higher advancement the bait for the few. That such men are capable of commanding regiments with advantage to the State and credit to themselves is shown by the example of the Imperial Service Troops: whether, however, they can be expected to prove as useful, in a military point of view, as British Commanding Officers, is more open to question. For purely regimental purposes, and when acting alone, or with small columns, the Native Commanding Officer might get on all right, but when important operations were in progress it might be very difficult for him to grasp the situation in such a way as to enable him to co-operate with other troops to the best advantage. Assuming, however, that it would be possible to get a suitable class of men the difficulty at once arises as to how it would be possible to fit him into our present military organisation. To show how difficult this is, it will be as well to consider the possible solutions of the problem with their respective advantages and disadvantages.

V.—POSSIBLE WAYS OF WIDENING THE SCOPE OF EMPLOYMENT.

The possible ways of opening a wider career to Native Officers on the lines suggested above would appear to be as follows:—

- (1) To throw open Sandhurst to Indians and allow them to compete on equal terms for commissions in the Indian Army.
- (2) To give them direct commissions in the Indian Army as Jemadars and allow them to rise through the rank of Subadar to that of Double Company Officer, Double Company Commander, Second-in-Command, and Commanding Officer, the higher commissioned ranks of a regiment being filled partly by British Officers, partly by Native Officers.
- (3) To give them direct commissions as Jemadars in special Corps in which all the Officers would be natives, except, at first, the Commanding Officer and the Adjutant. In this case the regiment would be officered on the lines of

- a British Regiment, for Double Company Officers and Double Company Commanders would be superfluous.
- (4) To give them direct commissions as Jemadars and let them seek for outside employment on the Staff, as A.-D.-Cs., and so on.
 - (5) To give them direct commissions as Jemadars, let them rise to Subadars, and then try and find employment for them outside the Army, as Political Officers, Civil Officers, and so forth.

In the above suggestions (2—5) the Native Officer with a direct commission has alone been mentioned, because considerations of age and want of education would, as already pointed out, necessarily debar the vast majority of men promoted from the ranks from seeking such higher employment as is here contemplated. Should, however, the exception arise he could be dealt with on similar lines, and given an equal opportunity of advancement.

- (6) Start an Indian Short Service Army, or Militia, raised by conscription if necessary, in which all the Officers, with any necessary exceptions, would eventually be Native Officers.

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VI.—ADVANTAGES AND DISADVANTAGES OF THE WAYS SUGGESTED.

1. To open Sandhurst to Indians would have the advantage that candidates for commissions in the Indian Army would have to go through a preparatory training at Home—they could hardly hope to pass direct from India—and they would also have the advantage of the discipline, training and associations afforded at the Royal Military College. They would, therefore, bring to their regiments a certain elementary knowledge of the methods of life and manner of thought of the class of which their future brother officers are composed. This would afford them a better chance of being able to conform to their new environment, while the military knowledge acquired at Sandhurst would give them a useful start in their military duties. On the other hand, the disadvantages of such a system are exceedingly grave. In the first place, the question of expense would debar many possible candidates. In the second, it would be necessary for the candidates entirely to give up all ideas of caste and be prepared to live as Englishmen live. Whether this would enhance their prestige with the native ranks, or obtain for them the ready and cheerful submission that the British Officer can count on, may be doubted. In certain regiments, at any rate, they would be regarded as renegades and apostates unworthy of the trust and confidence of their men. Then again we must reckon with race prejudice, with the natural gulf that lies between East and West. With the best of intentions the British Officers would find it hard to associate on equal terms, in the close intimacy of regimental life, with men of another race, even though the latter were outwardly of the same stamp as themselves. Complications would be bound to ensue, if not with the Officers themselves, then with their wives and families.

The native view of women is so diametrically opposed to our way of thinking, that English ladies could not be expected to meet them on equal terms or receive them in their houses on the same footing as British Officers. This may seem a minor point, but regimental efficiency depends so largely on the maintenance of amicable social relations between the Officers that it would be unwise not to take the matter into consideration.

Another point to consider is that the numbers of successful Indian candidates might be so great as to swamp the British candidates, and though this could be provided for by limiting the number of commissions offered to natives, it would not be desirable to bring the two classes into direct competition with each other. Were Indians admitted to the Indian Army in this way it would be necessary to pay them at the same rate as the British Officers, and offer them the same pensions, and family pensions, and this would cost an undue burthen on Indian finances, for it is obvious that men whose permanent domicile is in India do not need such high rates of pay as those who serve there for a time, but have all their interests in Britain, where they must educate their families, go for leave, and live when they retire.

It is true that a step in this direction has been made in the case of Indians admitted to the Indian Medical Service who are graded with, and rank on a perfect equality to, the British Officer. Their numbers are, however, comparatively small and the nature of their work does not throw them into very close contact with the Regimental Officer.

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but, at the same time, it must be admitted that the solution considered above is not a feasible one, and that the remedy, if to be found at all, must be sought for in some other direction.

2. To allow Native Officers entering the Service with direct commissions to rise through the rank of Subadar to that of Double Company Officer, Double Company Commander, Second-in-Command, and Commanding Officer, the higher commissioned ranks of a regiment being filled partly by British and partly by Native Officers would have the following advantages:—

- (a) It would, undoubtedly, have the effect of opening out a wider career to the superior class of Native Officer that might be expected to be attracted by the improved prospects held out.
- (b) It would ensure that in the early part of their service they would be taught and supervised by British Officers, and it might be expected that close association with them would inculcate that sense of duty and spirit of discipline which is such a marked feature of the average British Officer.
- (c) It would, to some extent, obviate the danger that the native ranks would come too much under the influence of their Indian Officers.
- (d) It would lessen the chances of intrigue in such matters as promotions and appointments.

On the other hand, it would have the following disadvantages:—

- (a) It would reduce the number of promotions from the ranks and so tend to dishearten the non-commissioned officers and men, and discourage recruiting.
- (b) The introduction of a different element in the ranks of the superior officers would render the regiment less homogeneous, and to this extent, even assuming the Indian Officers were man for man the equals of their British comrades, would detract from the general efficiency of the unit.
- (c) The reduction this scheme would entail in the number of British Officers in the Indian Army would be a serious matter. Government can hardly be expected to pay for the same number of British Officers as at present if Native Officers are to be allowed to do the work of some of them, even though the Native Officers are, as we think they ought to be, paid at lower rates than the British Officers.

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- (e) Finally, the position of these Native Officers as regards the Mess has to be considered. Many of them, for caste reasons, could not be asked to join; they would, therefore, have to live apart and would never be able to consort with the British Officers on equal terms. As regards the Officers they would be in the regiment but not of it, a satisfactory state of things for neither party. As regards any of the Native Officers who might elect to join the Mess, as most of the Indian Medical Officers of native extraction do elect, the same objections and difficulties would occur as was pointed out would be inevitable in the case of Native Officers entering the Indian Army through Sandhurst, only that in this case they would be increased by the lack of the previous training and experience that would be gained by the Sandhurst cadet.

It will be seen, therefore, that the advantages of this scheme are largely outweighed by its disadvantages; that it entails the substitution of a certain number of Native Officers for British Officers; and that its only military advantage is the prospect of opening out a wider field of employment to a deserving body of men.

3. The proposal to ear-mark certain corps for the special benefit of Native Officers, so that they may rise in them to the rank of Commandant has a good deal to be said for it:—

- (a) It would open out a wider career to the Native Officers without bringing them into direct competition with the British Officer.
- (b) It might be expected, in consequence, to attract a very good class of man.

- (c) It would avoid all complications as regards the Mess, and social relations between the two classes of Officers. Though at first a British Commanding Officer and Adjutant would be necessary to start the new system there would be no need to form a Mess for them, and as soon as Native Officers could be found to replace them, the British Officers would disappear altogether from the cadres of the regiment.
- (d) As, eventually, no British Officers would be required with these regiments, and as Double Company Commanders and Double Company Officers would not be necessary, it would be possible to give the Native Officers in them a somewhat higher rate of pay than Jemadars and Subadars receive at present, and, in order to educate them up to the position of Commanding Officer, it would be well to have two appointments as Major. It would also be desirable, in order to discriminate the Native Officers in these regiments from the men who had risen from the ranks in the ordinary way, to abandon the title of Jemadar and Subadar and call them Lieutenants, Captains, Majors, Lieutenant-Colonels, and Colonels. There would be no more objection to doing this than to giving similar rank to the Indian members of the Indian Medical Service, and it would be very popular with the class of men it is desired to attract.
- (e) If the experiment proved a success it could be still further developed by giving further promotion to the Commandants who had proved their worth, either by appointing them to the General Staff of the Army, or by promoting them to General rank. In this way a very wide military career would be opened out to the selected Native Officer, and we might, in time, find men to emulate the example of General Alikanof.

Against these advantages, however, must be set the following disadvantages :—

- (a) The system of promotion proposed would hold out no advantage to the Native Officer who has risen through the ranks. There might be a few exceptional cases of men who had won promotion with unusual rapidity and were mentally fitted, and sufficiently educated, to compete with the new class of Native Officer, but, speaking broadly, the bulk of the Native Officers who had risen, or might hereafter rise, from the ranks would not be benefited by it.
- (b) It would also be a direct disadvantage to the rank and file of the Indian Army, in that it would lessen the number of promotions from the ranks, and this, as we have already pointed out, might injuriously affect recruiting.

- (c) It would raise a difficult question as to the promotion of men in the special corps selected for the experiment. To debar them from any chance of promotion to Native Officer would be to utterly discourage the senior Non-Commissioned Officers. To promote them in their own regiment would be out of the question, except under very special circumstances, while to promote them into other regiments would again react unfavourably on the latter.
- (d) The next point to consider is whether the efficiency of the Indian Army as a whole would be enhanced by the measure suggested, and it is difficult to answer in the affirmative. The splendid work done by our Native troops in the past has been very largely due to British leadership. Without the guidance and example of European Officers, natives, even of the best fighting classes, appear incapable of developing their full value. They may, it is true, fight gallantly and display the utmost heroism and disregard of death, but their efforts are spasmodic and disjointed, and any considerable military combination appears to be beyond their powers. If we look back on the history of India it is strange how few, amongst the many warriors Hindustan has produced, have left their mark as great Captains. Even when India was torn by warfare from sea to sea; when the soldier's trade was the only career deemed fitting the energies of a virile man; when constant practice should have made the Indian Captain of Irregulars a perfect leader of men, we find that their greatest successes were almost invariably attained under European leadership, that the presence of military adventurers from Europe was eagerly sought by the Indian Princes to organise and lead their hordes of mercenaries, and that these European trained troops, under their foreign leaders, were the most difficult adversaries our Generals had to encounter in the early days of the last century. The Sikhs and the Gurkhas fought against us with the utmost bravery, and not altogether without success, but one trembles to think what might have been the fate of British rule in India had those gallant soldiers been trained and led by British Officers. If, therefore, we are to believe the teachings of history we must recognise that Native Regiments officered entirely by Native Officers cannot be expected to possess the same fighting value as those led by British Officers. There may, of course, be exceptions, but it would be strange if these special regiments did not come to be regarded, and with some justification, as second-line troops. This, perhaps, would be a minor objection

could the number of such special corps be strictly limited, but it may be pointed out that if the experiment is to be a real one, and if it is seriously contemplated to open out a wider military career to our martial races, it will be impossible to limit it to one or two regiments. Men of various races and creeds will have to be provided for, and calculating on 20 Native Officers per regiment, if a whole Division of three Brigades were ear-marked for this purpose, it would only find employment for some 240 Native Officers. This would be a mere drop in the ocean when we think of the hundreds of candidates that might be expected to come forward for such an opening. On the other hand, can we afford to weaken the fighting efficiency of even one of our Divisions in order to provide a wider career for individuals however deserving they may be?

If it were possible to have these regiments additional to the existing establishment, the above objections would not apply to the same extent, though even then it might be argued that if we are to raise more troops why not have them of the best?

- (e) A still more serious objection lies in the political danger this proposal might introduce into the Indian Army. It is an admitted fact that attempts have of late been made to tamper with the loyalty of the Native troops. That such attempts are not to be treated lightly the history of the Mutiny shows. Under our present organisation the British Officers of the Indian Army are in such close touch with their men, and have such opportunities for gauging the state of their feelings, that any serious spread of disaffection is unlikely to pass unnoticed. Moreover, the influence of the British Officers is a strong safeguard against the teachings of the disloyal. Remove the British Officers from a regiment and hand it over entirely to the care of its Native Officers, and that corps may become a sealed book to the authorities.

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While thinking, therefore, that this proposal is the one best adapted to attain the objects this Essay is intended to discuss, we are compelled to admit that it is fraught with danger, and, if adopted at all, should be started very gradually and the result of the experiment watched with the most anxious care.

- (f) A further difficulty in connection with this scheme has already been touched on, and that is the need it would create for some form of preliminary military training for the candidates for commissions in the special regiments. At first, and if very few such commissions were

given, it would be possible to appoint the candidates to regiments as probationers, and allow them to learn their duties in the corps. If, however, the system was introduced on any considerable scale it would be necessary to start some such training institution as an Indian Sandhurst, and here again it would be necessary to move with the very greatest care so as to guard against any possibility of the institution becoming a focus of disloyalty and discontent.

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It will be seen that the difficulties and dangers of this scheme are not inconsiderable. From the purely military point of view we should be most unwise to change our present system in any such direction. In India, however, political considerations must receive due weight, and if it is thought by the responsible authorities that a measure such as this would win over to the side of Government the important class which would benefit by the change, it will be the duty of the military authorities to do all in their power to make it a success. A considerable political gain may more than compensate for a certain military loss, but let us be quite sure before we sanction that loss that it will be a political gain and not a source of political danger.

4. The proposal to give candidates direct commissions as Jemadars and encourage them to seek for outside employment on the Staff, as A.-D.-Cs., etc., has the advantage that it would not interfere with existing conditions of service; the men so entering would be few, and would be birds of passage, so they would have no real influence on the life of a regiment. On the other hand, it is no radical solution of the difficult question before us. It would provide an easy and pleasant life for the few, but would not affect the many, and it may be doubted whether it would have any political effect at all. Any system to be of real value must start with the regiment, and the position of Commandant must be to the new class of Native Officer what the position of Subadar-Major is to the old.

5. In the same way, to encourage men to enter the Army as Native Officers with a view to seeking ultimate employment elsewhere would seem to be a mistake. If their instincts and traditions are martial; if their aspirations point to a military career; why, so to speak, blood them, and then draft them off to some less congenial employment? If their whole aim and object is to follow the profession of arms, the fact of their having entered that profession will not incline them to lay down the sword and take up the pen. If, on the other hand, their military experience is to be regarded as a mere stepping-stone to some other career, why not start them on that path straightaway, without wasting their time and that of the Corps to which they are attached, by embarking on studies, and acquiring habits, that are only temporarily of use to them? Some might, doubtless, be provided for in the Political Department,

others in Civil Departments, or in the Police, but wherever they went they would not unnaturally be regarded as interlopers and intruders, for they would have to go over the heads of men who had already served in those departments for a certain number of years. It would thus follow that while doing our best to make one class of men contented we should be causing discontent among other classes. If anything in this direction is to be done for the Native Officer, it should, therefore, be arranged in such a way as not to interfere with other peoples' interests. Possibly as new canals are constructed and fresh tracts of land opened up to cultivation, suitable grants might be given to deserving Native Officers, but this again would be a step rather in the direction of rewarding past services than of opening out a wider career to our martial races.

6. The proposal to start a Short Service Army or Militia opens out a much wider field of speculation. Such a force would, necessarily, have to be supplementary to our present Regular Indian Army, and it would involve a complete change in our military system. It would, of course, like all other compulsory forces, have to be employed mainly for home defence. It could not be employed in stations beyond the frontier in times of peace, though in the event of war it would, naturally, have to serve wherever required. A force of this description may one day become necessary owing to the political and military changes of the future, and it would, undoubtedly, form a most fitting field for the ambitions of the martial races of India. Such a force would alone offer a sufficiency of employment to really solve the question of a suitable military career for Indians, though it may be questioned whether it would attract the more fiery and ambitious spirits, seeing that the chances of active employment would probably be extremely small. It is obvious, however, that such a novel departure in our military system in India could not possibly be entered upon for the sake of one particular class of men. Should it ever be necessary to raise such a force, for reasons of State, it would go far to solve the problem under discussion, for it could be officered almost entirely by Indians, once it was got into thorough working order, even the Brigades, and possibly the Divisions, being commanded by Indians. And the sedition question would hardly come in here for the existence of such an Army would presuppose that there was nothing to fear from its disloyalty or disaffection. This proposal does not come within the range of practical politics, but the time spent in discussing it is not wasted if only from the fact that it throws into vivid relief the far-reaching measures that would be necessary to open out a military career to any considerable number of Indians. As regards the present-day Native Officer, service in such an army would offer a certain amount of attraction for he could be drafted into it in a higher grade, and since the standard of efficiency would not be nearly so high as in the Regular Army, Native Officers who had risen from the ranks and shown average capacity might be usefully employed as superior officers in the short service regiments,

VII.—CONDITIONS AND ASPIRATIONS OF THE MILITARY CLASSES.

From what has been said under Headings V and VI it is evident that any scheme for opening out a wider military career to the Native Officers of the Indian Army is attended by very serious difficulties. In the first place, the material at present available is not, speaking generally, such as to encourage the belief that it could be usefully employed in more responsible positions. This is due to no fault or failing on the part of the men themselves, but is the inevitable result of the system under which they are taken into the Army and gradually raised to the rank of Native Officer. If, then, it is deemed that a wider career should, in future, be held out to them, it will be necessary to educate them up to their new responsibilities. How this could be done will be considered later on in dealing with the general question of how to raise the standard of efficiency among the Native Officers. In the next place, if we are to depart from the system of promotion from the ranks to any large extent, we are confronted by the objection that this will reduce the chances of future candidates among the non-commissioned officers and men, and, consequently, so far from widening their military career, will render it more circumscribed than it already is. Care must, therefore, be taken that in tapping new sources of supply we do not injure the old and well-tried ones. And, as regards these new sources of supply, it is necessary to bear in mind that it will take a considerable time before they can be made use of, and that, in the meantime, a considerable change is taking place in the habits and modes of thought of the classes whose interests this departure is intended to advance. During the long years in which the Pax Britannica has prevailed in India the fighting habit has, to a marked extent, cooled down many a family that formerly looked mainly to a military career as the only fitting one for their lads, now prefer to see them obtain civil employment, or even enter into trade. The former is so very much better paid that it is hardly to be wondered at that the pen rather than the sword is the object of ambition of the growing lad, while trade and business generally have solid attractions of their own. Then it must be remembered that the conditions of military life have become very much more strenuous. The strain of work in the Army is very severe in all ranks, and tends to become even more so as the standard of efficiency constantly rises. This fact has already had the result of reducing the competition for the British Army—as witness the great difficulty that is found in obtaining a sufficient number of candidates for commissions in the Guards and in the Cavalry, owing to the disinclination of men with private means to devote practically all their time to a profession—even to the profession of arms. In the same way, it is quite possible that well-to-do Indians will become less and less anxious to submit to the restraints and inconveniences of a military career, while those not so well off may prefer to seek

some more highly paid employment. It is possible, therefore, that an exaggerated view is sometimes taken of the political harm that results from the lack of a suitable military career for well-born Indians, and that, in reality, the demand for such an outlet for the military instincts of the rising generation is neither a very wide one nor a very urgent one. In a word, it is possible that aspirations for a military career are not very highly developed, except, possibly, in a few, and it is a question whether it would be to our advantage to encourage them.

VIII.—IMPROVEMENT OF THE NATIVE OFFICER.

As one proposal after another for widening the career of the Native Officer has been discussed, it has become more and more clear that the average Native Officer, who has risen from the ranks, is really not fitted for an enlarged sphere of usefulness. There are, of course, exceptions generally to be found in down-country regiments where the standard of education is higher all round, and, possibly, the intellect is more developed. Such men enter the service with a very fair education; they can read and write, and possibly have some knowledge of English; consequently, by the time they rise to the position of Native Officer they are exceedingly useful men and would probably do well in even higher ranks though their age must always prove somewhat of a drawback. In many of our regiments, however, and specially in the case of regiments recruited on the borders, or in the less educated parts of the country, such for instance as the Gurkhas, the Sikhs, the Pathans, recruits join the ranks with practically no education whatever. They have to be taught to read and write; they find it difficult to learn enough arithmetic to enable them to keep the ordinary company accounts; and all book examinations are a positive nightmare to them. Yet amongst such men, however, are to be found most excellent leaders of men, capable tacticians, and, generally, first-class fighting men who, as Native Officers, are a valuable asset to any regiment, and without whom the regiment would not be the formidable fighting machine it is. "The spirit of an army is in its officers," and it is officers such as these who, under British leadership, have made the Indian Army, next to the Japanese Army, the finest force in Asia. And this result has been attained without any system of specialised training for the Native Officer. He is entirely a regimental product, and is better or worse according as the system in any particular regiment is good or otherwise. On the whole, however, it may be safely said that he is fully qualified for the duties he is called on to perform, and we must be careful not to sacrifice his moral and natural qualities to a too great striving after mere educational improvement. At the same time, however, if the Native Officer who comes from the ranks is ever to be given a chance to go higher, it is obvious that he must be more highly educated than is the case at present.

Should it be possible so to train him, there is no reason why he should not be encouraged to seek for a wider career on the same

lines as those suggested for men who enter the Army with direct commissions. The relative advantages and disadvantages of those various methods have already been fully discussed, and the conclusion arrived at is that the most promising scheme propounded was that which provides for special Corps to be officered entirely by Indians. It was pointed out that, through age and the want of education, the Native Officer promoted from the ranks was not, as a rule, fitted for promotion to higher commands than that of a company. Should a way be found of overcoming the objections however, it would be preferable in every way to give such men a chance instead of relying on the candidates for direct commissions. The man from the ranks would have a strong sense of discipline; he would have a thorough military grounding; his character and disposition would have been carefully watched by his British Officers; his interests would be more bound up in the Service; * * *

* * * and, finally, so far from promotion from the ranks being retarded, it would actually be accelerated by his advancement.

The following scheme is, therefore, propounded with a view, not only to prepare the individual N.-C. O. for quicker promotion, but to raise the level of education throughout the non-commissioned ranks.

IX.—SPECIAL COURSE OF INSTRUCTION FOR N.-C.Os.

If a wider career is to be opened out to Native Officers it is essential (1) that they should attain the position of Native Officer much earlier than is at present the case; (2) that they should be much better educated.

To attain these desiderata, it is therefore suggested :—

- (a) That a School of Instruction be formed for N.-C. Os. at which English, and such military subjects as are suitable for a Native Officer aspiring to the ultimate command of a regiment, should be taught.
- (b) That, as a rule, candidates for this School of Instruction should have from five to eight years' service.
- (c) That the candidates be either sepoys or N.-C.Os.
- (d) That such candidates before being allowed to compete, or, if appointments to the School were made by nomination and not by competition, before being nominated, should have gone through a regimental course of instruction, have passed a qualifying examination before the C. O.'s Board, and be certified by the C. O. to be fit in every respect for promotion to the rank of Native Officer on probation.
- (e) That a selected candidate should undergo a two years' course of study at the School of Instruction, during which periodical examinations and a final examination would be held and, if successful in these and well reported on, he should be attached for one year, as Jemadar on probation, to an ordinary Native regiment.

- (f) That, if favourably reported on at the end of his year's probation, he should receive a commission as Lieutenant in one of the Special Corps in which all the Officers were, eventually, to be Indians.
- (g) That his subsequent promotion would depend entirely on the way he turned out, on the ability and power of command he evinced, and on his professional knowledge.

Under a system such as is indicated above there would be no interference with the ordinary flow of promotion, and it might be provided that a certain proportion of promotions to Jemadar were available in the Special Corps by transferring to other regiments the N.-C. Os. selected as Jemadars. Once the object of the system became known, there would be keen competition in the junior ranks to get admitted to the regimental course of instruction, and the more intelligent and ambitious sepoys would work their hardest to qualify for admission to the School of Instruction. Even if they were not successful in this, they would realise that the fact of their having gone through the regimental course would help them to obtain the ordinary regimental promotion, and, in this way, the educational level of the whole regiment would benefit. It may seem too soon in a sepoy's career to mark him out for special promotion before he has eight years' service, but, on the other hand, in the case of direct commissions, there is still less opportunity for weighing a man's capabilities.

If we take the average age of admission to the School of Instruction as seven years, the two years' course at the School, and the one year's probationary service as Jemadar, would bring his total service up to ten years; and, assuming the average age of enlistment to be eighteen, this would give the age at which a man would become a full-fledged Lieutenant, at twenty-eight, which would seem to be neither too young nor so old as to debar him from the hope of rising to the summit of his ambition—the command of his regiment.

As to the number of candidates that might be admitted to this School of Instruction, one nomination might be allotted to the regiments forming a Regimental Centre, and to groups of three Cavalry Regiments. In cases where only two regiments were allotted to the Regimental Centre, their proportion could be made up by taking a unit from the groups over three, and from the regiments still unallotted. This would give, roughly, a class of some 50 men which would be quite large enough to start with, though not too large, for the course should be sufficiently severe to weed out a fairly large percentage of the students, only the very best being allowed to go on. Those who failed from lack of application, defects of character, or want of ability, could be sent back to their regiments and graded there according to the nature of the report they had received. If they had done well, but not quite well enough for the higher career, they could be pushed on regimentally and become ordinary Native Officers, while if absolute failures they would sink back again into the obscurity of the ranks.

X.—THE SCHOOL OF INSTRUCTION.

The School of Instruction should be located at some central station, selected for its climate—work would have to be carried on all the year round—and for the training facilities offered by the surrounding terrain. Pachmari would seem to be a suitable place as there is every variety of ground within easy reach, the climate is temperate, and it would afford facilities for putting the students through a short course of musketry.

The object of the school should be not so much to nurture budding Napoleons, as to turn out men capable of acting on their own initiative; able to handle their regiments or companies with average tactical skill; ready to conform to the movements of other troops; and thoroughly imbued with the spirit of co-operation. English would have to be systematically and thoroughly taught, and to ensure that this was done it would be a good plan to carry on all the instruction in English.

As regards military subjects the course might be a modified Sandhurst one, calculated to give the students a working knowledge of tactics, military surveying, military law, and military administration. No very high standard should be required, provided the student learnt enough to carry out his ordinary military duties as a regimental officer with average ability.

At the same time every effort should be made to train the character; the students should be accustomed to act on their own initiative, to accept responsibility, and to act on their own judgment; their feelings of loyalty to the King-Emperor, and devotion to the Service, should be encouraged and stimulated in every possible way; and they should be taught sufficient Indian history to show them the great and lasting benefits that have been bestowed on the country by the British Raj.

At first, the task of imparting all this knowledge to men of many different races, of varying shades of ability, and of diverse character, will be a very difficult one. If, however, really able men are selected as instructors, and made to understand that success in their efforts will bring substantial reward, a workable system would soon be evolved, and very good results might be looked for. At first all the instructors would have to be English Officers, but, eventually, it would be possible to train some of the students, as Assistant Instructors, and their assistance would be of the greatest value.

The above is, of course, merely a rough sketch of the system proposed, but it serves to show that if it is really intended to open out a wider career for the Native Officer, it will be necessary seriously to consider the best means of improving his education, and of fitting him for promotion at a comparatively early age.

XI.—THE PROBATIONARY PERIOD AS JEMADAR.

Having passed successfully through the School of Instruction the student would be posted to an ordinary native regiment for

one year as Jemadar, on probation. It would be advisable, perhaps, to post him to his own Corps as the C. O., and British Officers, generally, would naturally take a special interest in him and, for the honour of the Corps, endeavour to teach him as much as possible during his year's probation. On the other hand, they might be inclined to judge him too easily and be reluctant to spoil his chances of further advancement by reporting unfavourably on him. In any case, during the probationary period he should be very carefully watched and given every opportunity of learning his duties and generally improving himself, and should the result not prove satisfactory, no hesitation should be felt in reporting him as unfit for appointment to the rank of Lieutenant in the Special Corps, in which case, if considered fit to be an ordinary Jemadar, he could be kept on in that rank; if not, he would have to revert to non-commissioned rank.

XII.—THE SPECIAL CORPS.

It has been shown that it would be exceedingly difficult to arrange for British and Native Officers to serve on equal terms in the same regiment, and to avoid this difficulty it has been suggested that Special Corps should be formed in which the Officers would, in time, be Indians only.

The number of Corps that should be allotted to this purpose would, of course, depend on the extent to which the new system was adopted. In any case, they could not be started at once. It would be necessary to select the regiments for the new system of officering, and gradually appoint selected Native Officers as Lieutenants. In due course, these would be appointed as Captains, the Jemadars superseded being either transferred to other regiments, or sent on pension. Thus, in time, the Companies would all be commanded by Native Captains, with Native Lieutenants to assist them. The next step would be to promote one or two Native Majors and, finally, a Native Commandant. Up to this point a constantly decreasing number of British Officers would have been with the regiment; when two Native Captains, for instance, were commanding companies one Double Company Commander would go, his Double Company Officer having gone some time before. The Adjutant and Quarter-Master would probably be kept on to the last, and would finally vanish with the last British C. O.

The question would then arise as to whether any British supervision at all was to be maintained. An Inspecting Officer might be appointed on the lines of the Inspecting Officers of Imperial Service Troops, whose duty it would be to act as general adviser and supervisor to the Native C. O. As, however, it will take a good many years to arrive at this stage, it is not necessary to labour the point. By that time experience would have shown how far British supervision was necessary with the new class of Native Officer, or how far it would be safe to trust him with a free hand.

Experience would also show whether it was better to have the Native Officers of these Corps of different races, or whether it would be preferable to have them all of the same class, and that the class of their men.

In such Corps, with specially selected and carefully trained Native Officers, there would, undoubtedly, be free scope for the natural leaders to come to the front, and, should the experiment prove a success, it would certainly open out a very much wider career to the Native Officer than he can hope for at present, a career with the command of a regiment as its prime, but not necessarily culminating there, since a really successful C. O. might reasonably look for still further advancement.

XIII.—SUMMARY.

In dealing with the subject of the Essay two classes of Native Officers have had to be kept in view—the man promoted from the ranks, and the man with a direct commission.

Their conditions of service, their previous mode of life, and their respective ages are so dissimilar that it was necessary to treat them separately.

The man with a direct commission starts with certain advantages: he is younger, probably better educated, and possibly of higher social rank than his rival. At the same time there are certain serious objections to him—he is not so amenable to discipline; he has not had the advantage of going through the mill in the ranks; and his admission to the rank of Native Officer stops promotion through the ranks, and so injuriously affects recruiting. Any extension of the system of direct commissions was, therefore, deprecated.

As, however there is generally supposed to be a large class of men who, finding no scope for their inherited martial instincts in the British Service, are apt to become discontented and disloyal, an endeavour has been made to see whether some scheme would not be possible under which this class could be offered a wider military career than is at present possible for them.

The result was by no means satisfactory for, though several schemes suggested themselves, they were all attended by such serious disadvantages as to render them unacceptable from a military point of view, though, as pointed out, political considerations might be strong enough to outweigh purely military objections.

Should such be the case, the most promising way of opening out a career to these men would appear to be that suggested under Heading V. para. 3, *i.e.*, that they should be given direct commissions as Jemadars (or preferably as Lieutenants) in Special Corps in which all the officers would, eventually, be Indians.

As, however, the adoption of this system would mean the advancement of the man with the direct commission at the expense, or rather to the exclusion, of the man who had risen through the ranks, a suggestion has been put forward for the improvement of the latter.

Other things being equal, the man from the ranks is preferable to the man with a direct commission, and, under the plan suggested, the former would be so educated and pushed on that he would attain the rank of Lieutenant in about ten years' service. Should the system prove successful, we should get a new and highly educated class of Native Officer without in any way affecting regimental promotion, and with such chances of promotion there would be no reason why men who are now candidates for direct commissions should not enlist in the ordinary way in the hope of rapidly working up to commissioned rank. Certainly, they would be all the better soldiers for their experience in the ranks, and many of the objections to their employment would be met by the fact that they had so served.

XIV.—CONCLUSION.

In the introduction to this Essay it was pointed out that the subject was a difficult one owing to the fact that it could not be approached only from the military point of view. The Indian Army, under its present system of officering, is so efficient and so ready for service; its past history has been so glorious; its campaigns and expeditions have been so uniformly successful, that one is, at first, tempted to ask "Why seek to change or modify a system that has proved its value and shown its worth?"

On closer consideration, however, it has to be recognised that political and other considerations may render it necessary to submit to a certain military loss in order to obtain specific advantages in other directions. Good as the Native Officer undoubtedly is in his present position, it is hard to believe that regiments partly, or wholly, officered by them in lieu of by British Officers would have quite the same fighting efficiency, or to deny that these regiments might constitute a certain political danger. On the other hand, we must take the "long view" of the situation, and be prepared to meet a demand for a wider military career for Indians. As yet this demand is not put forward so much by the Army itself, as by some of the Indian Reformers, but with the advance of education and the growth of national aspirations, it is quite possible that, a few years hence, there may be a very real desire on the part of the more intelligent Native Officers to have a wider career open to them. This point of view has recently found expression in the pages of an English Magazine, and it may be worth while to quote from an article in "The Nineteenth Century and After"—January 1909, by Mr. S. M. Mitra entitled "Indian Reforms: a Hindu View." "The Native Army," he says, "fights side by side with the Imperial Service Troops of the Native Princes. The British sepoy takes advantage of the opportunity to discuss with the Raja's sepoy the merits—from their point of view—of the British and the Raja's service. He finds that there is a difference in their treatment. And that difference is not in favour of the British sepoy. Let us take the case of two brothers who start in life as military men. The one who joins the Army of the Native Prince may in time become the Commander of the Army; the

other, who joins the British service, with all his medals and clasps and hoary beard, will have to spend his days under the youngest British subaltern. He may render exactly the same service as his British comrade has done, but on account of the colour of his skin he is debarred from getting the much coveted Victoria Cross."

The latter grievance hardly comes within the scope of the Essay, but it may be remarked, *en passant*, that the extension of this distinction to the Native Army would be received with acclamation by their British comrades.

As regards the question of promotion, however, Mr. Mitra's remarks show the light in which it is regarded by educated natives, and what they think to-day may be thought by the sepoys to-morrow. Could the Native Officers who show themselves fit for higher promotion be graded on one list with the British Officers in the same regiment, the question of their promotion would be much simplified, but, unfortunately, as we have seen, racial and caste prejudices would render this out of the question. By ear-marking certain Corps, however, to be in course of time officered entirely by Indians, and by giving the Native Officers in these regiments rank corresponding to that of the British Officers in the ordinary regiments, a far wider military career could be opened out to them than is at present the case. To fit them for these higher appointments and greater responsibility a younger and more highly trained class of Native Officers will be necessary, and an attempt has, accordingly, been made to show on what lines this could be carried out. Were this system started it would be possible to limit still more the practice of giving direct commissions, future candidates for such being encouraged to enter the ranks instead, and trust to their superior education and intelligence to rise rapidly to the rank of Lieutenant.

The extent to which this system could be applied with safety would depend on many considerations. On the one hand, it would not do to lessen the military efficiency of more units than necessary by depriving them of their British Officers. On the other, if carried out on too small a scale, the experiment would benefit so few Native Officers that its effects would be inappreciable. In any case, it would be advisable to proceed very carefully at first, and to watch most closely the development of the selected Native Officers, and the condition of the Corps officered by them. Should the experiment prove successful it would, undoubtedly, go far to solve the problem of how to provide a wider career, within the Army, for the Native Officer, and would also have the effect of raising the level of knowledge and efficiency throughout the Indian Army.

The attempt to suggest a wider career for Native Officers outside the Army has not proved very fruitful. If their traditions and aspirations point to military service they would hardly appreciate their transfer to employments outside the Army. If, on the other hand, their instincts point to a civilian career why waste their time, and that of their instructors, in preparing them for duties they are longing to escape ?

Finally, it may be pointed out, that as any wider career will only affect the few, and not the many, the more the latter can be rendered happy and contented at the end of their service the better. They have served Government well and faithfully and their services should receive suitable recognition. The pensions given are fairly liberal, but it would cost nothing, and be very popular, if a much larger number of Native Officers were given some distinction on retirement, such as the honorary rank of Lieutenant or Captain. It should also be arranged that they should have special facilities for getting their cases heard in Court, and Civil Officers should be encouraged to show them special attention when visiting their districts. Such small tokens of respect and esteem are highly prized by natives and the more the "izzat" of the Native Officer is encouraged and respected, after his retirement as well as when he is actually serving, the better for the Army. Again, much more might be done for this class of men by the grant of canal, lands and so on. The surest recruiting agency for the Army, and the surest foundation of loyalty, is the sight of a retired Native Officer, proud of himself and of his regiment, respected by the Civil and Military Officers he may be thrown in contact with, and treated by all as a person of importance.

Full of years and of honour the Native Officer retires to his village; he tells of his service and adventures in his "paltan"; recalls the names and characteristics of his Officers; imparts lessons of loyalty to the Sirkar, and devotion to duty; inspires the village lads to emulate his example; and in retirement, as in the regiment, is a standing example of the truth of our Motto, that

"The Spirit of an Army is in its Officers."

LA NATION SOUS LES ARMES.

Conférence délivrée par Monsieur Muller-Desroches, professeur de langues, à l'hôtel de ville de Simla le 25 Aout 1909.

MESDAMES ET MESSIEURS.—Je me sens quelque peu confus, quand je me vois moi, simple civil, sur le point de traiter un des sujets les plus palpitants, les plus actuels, qui touchent aux intérêts vitaux de toute nation qui tient un rang dans le monde et qui veut et doit impérieusement garder ce rang.

Dans les quelques idées que j'ai à donner je me bornerai à considérer mon sujet sous un point de vue complètement en dehors du cadre technique ou politique. Je me propose uniquement ce soir de vous mettre sous les yeux les nécessités qui doivent déterminer une nation à adopter le service obligatoire dans l'armée, le sens qu'il faut donner au terme de "nation armée," les éléments qui doivent composer cette armée; je vous donnerai, si cela peut avoir quelque intérêt, des détails très sommaires sur la vie militaire du soldat français; tel est en peu de mots le résumé de ma conférence, qui elle-même, vu la largeur du sujet, ne sera qu'un aperçu très restreint de la question.

Au milieu du vacarme de l'industrie, dans le brouhaha du commerce, au milieu de nos travaux, de nos plaisirs et de nos amusements dans nos écoles, dans nos réunions publiques, dans les journaux et dans les livres, dans les congrès on s'est donné comme mot d'ordre de prêcher la paix. Mais en dépit de ce courant d'idées pacifiques, n'entendons-nous pas à chaque instant le cliquetis des armes, la voix du canon, le cri des mourants et des blessés sur quelque champ de bataille proche ou lointain? En un mot n'est-ce pas l'écho de la guerre qui frappe nos oreilles, n'est-ce pas la guerre elle-même, cette chose horrible et inévitable, qui ride le front de nos hommes d'Etat et de nos généraux, qui hante le sommeil de nos mères, de nos femmes, de nos enfants? Malheureusement oui, en dépit de tous les progrès, en dépit de tous les congrès pacifiques, en dépit des efforts faits par la partie plus intelligente de l'humanité pour conjurer les guerres, cet assassinat légal de l'homme par l'homme existe et existera tant qu'il y aura des hommes: *Homo homini lupus*: cette parole d'un vieux Romains, peu flatteuse je crains pour notre humanité susceptible, reste toujours vraie.

La première conséquence d'un tel état de choses c'est de nous amener à réfléchir. Qu'est-ce à dire? si la guerre est un mal contingent, si elle est une chose probable, inévitable un jour ou l'autre nous n'avons d'autres ressources que de nous y préparer; préparer est déjà insuffisant, il faut être simplement prêt.

Les propositions de désarmement, très humaines, très philanthropiques, il est vrai, ne constituent malheureusement qu'une

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utopie de plus parmi tant d'autres : En 1801 déjà Napoléon, alors seulement consul, écrivit à la Cour de Vienne, demandant un désarmement général. "La cour de Vienne, lui répondit-on, ne saurait désirer mieux, mais la difficulté consiste à persuader la cour de Berlin d'y adhérer."

Les réglemens de l'Institut me défendent de faire des comparaisons désobligeantes, je laisse donc à mes auditeurs le plaisir de méditer sur le fait de 1801 et sur des faits plus récents. De même que la proposition de Napoléon fut suivie comme vous le savez de la chevauchée victorieuse et sanglante du grand empereur à travers l'Europe, de même le congrès de La Haye, par une ironie du sort vraiment remarquable, se vit couronner par une des guerres modernes les plus terribles : les routes de Port Arthur à Moukden ne sont que trop éloquentes sur ce sujet.

Cette guerre comme bien d'autres ne nous apprend pas seulement qu'il faut être prêt, mais elle nous dit aussi qu'il faut être prêt pour une guerre sans merci. Et si nous devons encore en douter, écoutez les paroles d'un général de quelque autorité, dont on me saura gré de taire le nom et la nationalité. Dans une étude sur la prochaine guerre franco-allemande qui a été publiée je crois l'année dernière et qui a produit quelque émotion, le général s'exprime comme il suit : "La victoire doit terminer la campagne ; il ne faut pas seulement battre l'adversaire, il faut le briser, l'anéantir, le faire disparaître du sol."

Il s'agit donc si je ne me trompe ici d'une guerre à mort, d'une guerre au couteau. Qu'en pensent les intellectuels ?

Nous autres et tous ceux qui ont encore un brin de bon sens vous diront de nouveau : soyons prêts ! prêts non-seulement à défendre notre pays, mais encore, le cas échéant, à porter l'offensive sur le terrain de l'ennemi lui-même.

Mais comment serons-nous prêts ?—En mettant le pays et la nation sur un pied armé. Mettre le pays en état de résister à toute invasion est un problème excessivement compliqué dont vous me permettrez de ne point parler. Je n'ai d'ailleurs ni autorité ni connaissances spéciales pour traiter un sujet si vaste, sujet qui à lui seul pourrait remplir plusieurs conférences et pour lequel je vous renverrai aux conférences faites à l'école des hautes études spéciales de Paris vers la fin de l'année dernière et au commencement de cette année et dont je n'ai malheureusement pu lire que les résumés.

La défense du pays en effet exige des travaux et une administration dont un simple mortel se fait à peine une idée. La topographie naturelle d'une contrée aussi bien que les fortifications artificielles jouent un rôle plus ou moins important dans la défense du territoire.

Mais pour qu'une contrée soit en état armé il ne suffit pas que les voies de communications soient bien organisées, qu'il y ait des ports et des places fortifiées, que de beaux et puissants navires, qu'une tempête ou un accident insignifiant peuvent détruire, promènent leurs poupes sur l'océan ; il ne suffit pas que les magasins

soient remplis de vivres, de fusils et de munitions, d'effets d'habillement et d'équipement; il ne suffit pas d'avoir des chevaux et des canons et un trésor public bien rempli, tout cela serait sans valeur et même ridicule s'il n'y avait pas derrière ces machines de destruction un instrument intelligent, l'homme, créateur et acteur à la fois dans cette comédie ou tragédie que nous appelons la guerre.

Puisqu'une grande partie des hommes fait en réalité partie de l'armée et qu'un plus grand nombre est probablement destiné à en faire partie un jour ou l'autre, il n'est donc pas sans intérêt d'étudier le rôle et la place de l'homme dans cette organisation.

Qu'est-ce donc qu'une nation armée?—Pour le public ordinaire c'est le soldat, le pioupiau, avec un uniforme plus ou moins élégant qui allume l'imagination des enfants et des femmes, un soldat avec un cheval, un fusil, un canon. Le peuple dans sa naïveté ne va guère plus loin. La revue, les parades flattent sa vanité, son orgueil; du côté tragique de la vie militaire il s'en moque, ou il l'écarte de parti pris. Tant qu'il ne porte pas lui-même le sac, ou tant que quelques membres de sa famille ne prennent pas part à une campagne il oublie que l'armée c'est lui, le peuple; il oublie que le peuple est en quelque sorte l'identification de l'armée, ou du moins qu'il devrait l'être, et que d'un autre côté la véritable armée nationale doit être l'identification de la nation.

Cette idée n'est que trop claire si nous jetons un coup d'œil dans les différents codes militaires du monde. Le service militaire, lit-on par exemple dans la loi française, est égal pour tous, pas de dispense sauf l'incapacité physique; tout Français reconnu propre au service fait partie successivement—

de l'armée active durant deux ans;

de la réserve de l'armée active durant onze ans;

de l'armée territoriale durant six ans;

de la réserve de l'armée territoriale durant six ans;

il est mobilisable durant vingt-cinq ans, et libéré de tout service à quarante cinq ans.

Cette loi qui peut avoir ses avantages aussi bien que ses inconvénients est une des solutions parmi tant d'autres qui permet de mettre une nation sous les armes; elle prend comme vous voyez indistinctement dans le tas les hommes et les place bon gré malgré dans le rang; elle leur met les armes à la main et leur ordonne au nom de l'honneur et de la patrie de se considérer comme les défenseurs de leur pays et de se faire tuer pour lui s'il le faut.

Mais pourquoi cette levée en masse, pourquoi le service obligatoire quand il y a tant de moyens pour défendre un pays?

Mon Dieu, c'est très simple, les temps ont changé et avec eux la guerre ainsi que la méthode de faire la guerre. L'ancien système de recrutement amenait le soldat à faire une sorte de contrat avec son souverain ou son commandant, il devait faire ce pourquoi il était payé; d'autre part s'il n'était pas payé, si son chef manquait à son contrat, c'était la révolte, le désordre. Le soldat était un capital qu'il fallait ménager; d'où il résulte que les chefs cherchaient à livrer et

à gagner des batailles en ménageant leurs hommes ; l'état militaire était alors un métier comme un autre avec plus ou moins de risques.

Mais aujourd'hui ces risques ont changé. Depuis 1870 l'art de la guerre a peut-être fait plus de progrès que durant le temps qui s'est écoulé depuis la découverte de la poudre et cette même date. L'art de la guerre à lui seul étant devenu insuffisant il fallait des hommes en masse pour faire réussir les plans ingénieux des chefs d'armée. Ce fut, vous le savez tous, la Révolution française qui marqua le point de départ de la nouvelle science militaire, c'est elle encore qui proclama la patrie en danger et leva ces formidables armées qui constituèrent réellement la première nation armée. Au point de vue armement les campagnes de Napoléon ont eu pour effet immédiat de changer la tactique linéaire des autres puissances, et comme malgré ce changement la supériorité demeurait encore au nombre on s'efforça d'égaliser, de dépasser ce nombre, et alors la balance des victoires commença à pencher du côté des ennemis de la France. La science du nombre jointe à la supériorité des armements a donc triomphé ; et cette science durera jusqu'à ce que d'autres bouleversements changeront de nouveau les bases de la vie politique et militaire.

Aujourd'hui déjà les armées ont pris des proportions effrayantes ; et une armée de 100,000 hommes qu'on menait autrefois en campagne formerait tout juste aujourd'hui un corps d'armée.

Si donc la tactique moderne exige tant de troupes où ira-t-on les trouver ? Quel état, quel gouvernement du monde sera capable d'entretenir une telle armée (si elle n'est pas nationale) avec des finances qui sont toujours limitées ; car l'argent est également un facteur très important dans une guerre. "Pas d'argent, pas de Suisses," dit le vieux proverbe datant du temps des rois.

L'unique ressource était donc de faire appel à la générosité, au dévouement du citoyen lui-même et de lui demander de servir son pays. Mais là encore avant d'aboutir à l'état actuel des choses il a fallu des années et des années pour faire comprendre aux différents peuples la nécessité du service militaire dû par tout le monde ensuite il a fallu des mesures légales très rigoureuses pour appliquer la loi même à demi acceptée par l'opinion publique. Aucune nation peut-être n'a été plus rebelle à la conscription et plus tard au service régulier et obligatoire que la nation française. Les déserteurs et les insoumis sous l'Empire et dans les règnes suivants sont innombrables. Comme de nos jours on confondait alors ces deux choses bien distinctes : ÊTRE PRET A DEFENDRE SON PAYS, et ÊTRE CAPABLE DE DEFENDRE SON PAYS !

A quoi sert l'enthousiasme, le courage, la force d'un homme, quand au moment du combat il ne sait pas se servir de son fusil, quand il ne sait pas marcher ? Je me suis laissé dire à ce sujet une petite histoire incroyable si elle ne m'avait pas été racontée par un témoin oculaire ; un officier supérieur qui a fait la campagne d'Afrique, la vôtre, me l'a racontée ces jours derniers. Tout le monde se rappelle qu'au moment de la guerre contre les Boërs de nombreux volontaires se

furent enrôler à Londres et dans les autres villes du Royaume Uni ces braves gens qui allaient probablement se faire tuer de cœur content étaient pour la plupart si peu instruits, si peu entraînés (du moins au début de leur campagne), que cet officier m'assura avoir vu des hommes au lieu de charger leur fusils par la culasse, placer les cartouches dans l'étui à chiffon et à huile qui se trouve au bout de la crosse du fusil ; ce fait-là se passe de tout commentaire. C'est un fait exceptionnel, direz-vous ; je l'admets ; mais ne risquez-vous pas d'avoir des exceptions nombreuses si les hommes ne connaissent pas leur métier ?

A quoi bon le louable désir de prendre les armes au moment du danger quand en dehors des autres aptitudes on demande au soldat de marcher ? Le chemin de fer, il est vrai, a facilité les transports et permet de concentrer les troupes avec une grande rapidité en ménageant les forces des hommes ; mais le moment arrive où l'armée mise en position sur le champ de bataille probable aura à manœuvrer et à marcher ; marcher et arriver à temps à l'endroit voulu : n'est-ce pas là une chose importante, quelquefois capitale, dans la réussite d'un plan général ? Que de batailles perdues pour des corps de troupes arrivés en retard qui n'ont pas pu ou qui n'ont pas voulu marcher ? Est-il besoin de revenir sur Waterloo, sur la guerre 1870, de 1866, etc. ? Et quand dans ces conditions la discipline de l'armée se relâchait, le malheur était encore pire. Il n'est certes pas un seul parmi les officiers ici présents qui n'ait vu de ses propres yeux des cas où lu des récits dans lesquels il est dit comme quoi des hommes ne pouvant plus marcher jetaient leurs sacs et leurs fusils dans les champs et devenaient ainsi des quantités négligeables sans valeur aucune. Si ces choses-là peuvent arriver dans des régiments entraînés à quoi ne faut-il pas s'attendre de troupes complètement novices qu'on aurait dans la formation d'une armée constituée par un appel aux armes soudain et général de la nation.

Car c'est un fait admis par tout le monde que ce n'est pas en 24 heures, ni même en 24 jours, qu'un homme qui a vécu 30 à 40 ans d'une vie bourgeoise et tranquille, même en jouant du foot-ball et du tennis et en faisant de la gymnastique, qu'un homme, dis-je, fera trente à quarante milles de marche dans une journée ou pendant plusieurs jours continus avec le chargement militaire sur le dos, avec son fusil et ses cartouches. J'ai vu moi-même durant de simples manœuvres des réservistes ayant rejoint l'armée pour une période de 28 jours, des hommes qui pourtant avaient été soldats ; eh bien, au bout de vingt kilomètres ils traînaient la jambe, le lendemain ils se faisaient porter malades et suivaient la colonne en voiture ; à certaines étapes les voitures régimentaires ne suffisaient plus, il fallait réquisitionner des voitures dans les villages ; ce sont là des faits qui montrent clairement que le désir de servir son pays n'est pas suffisant mais qu'il faut être capable de le servir.

Des progrès sensibles cependant ont été faits pour avoir des hommes entraînés, ou "fit" comme vous dites. Dans tous les pays presque des régiments scolaires, des sociétés de tir et de gymnastique

se sont formées ; dans les uns, les jeunes gens sont initiés au maniement du fusil ; ils font de l'équitation et de l'escrime ; en Suisse j'ai même vu des jeunes gens de 15 à 17 ans faire des exercices de tir au canon sous la surveillance d'officiers d'artillerie, et des écoliers bien plus jeunes encore faire des marches militaires avec un chargement convenant à leur âge et à leurs forces.

Les sociétés de tir et autres n'enrôlent pas seulement des jeunes gens mais elles offrent aussi à l'homme qui a quitté l'armée l'occasion et les moyens de conserver les aptitudes acquises au régiment, s'ils ont compris l'importance et la nécessité de rester des hommes capables de servir leur pays. Et par là non-seulement le pays profite mais la santé individuelle et nationale ne peut que s'en féliciter.

L'armée, comme nous venons de voir, devant être composée d'hommes entraînés et propres à faire de la bonne besogne en temps de guerre, acquiert ainsi non-seulement une supériorité numérique mais des avantages moraux dont nous ne devons pas faire fi. Concernant la morale de l'armée je lisais il y a peu de temps seulement une étude magistrale écrite par un officier allemand dans laquelle il était strictement et minutieusement indiqué avec quel soin il fallait traiter et éduquer l'homme qui arrive au régiment ; car malgré les canons et les fusils le soldat n'est pas encore devenu un automate. Le calme, la présence d'esprit, le courage, la bravoure militaire ont sans doute pris une autre forme, mais ces qualités doivent être présentes et à un degré peut-être même supérieur. Ne croyez-vous pas qu'il faille une dose de courage extraordinaire pour s'avancer sur un terrain criblé de balles dont vous ne savez même pas d'où elles viennent ? Certainement le courage qu'on exige du soldat moderne n'est pas une petite chose, et le soldat qui marche sans sourciller vers un ennemi invisible, qui ne recule pas quand il voit son camarade tomber sous les balles invisibles, eh bien, ce soldat là est un héros !

Devant de telles considérations vous comprenez qu'il est d'une extrême importance d'avoir dans l'armée des hommes capables d'un tel héroïsme, et non pas un seul homme mais des milliers, mais tous. Pour l'armée active, qui forme l'armée de campagne proprement dite, c'est-à-dire l'armée de première ligne, le corps qui entre en contact premier et immédiat avec l'ennemi, les troupes qui ont à soutenir le premier choc d'où dépend peut-être la suite des opérations, *il fallait donc un corps d'élite.*

Ce corps d'élite, mesdames et messieurs, laissez-moi vous le dire, ne devrait être composé que de jeunes soldats dûment entraînés. Car quoiqu'on en dise, le jeune soldat est de beaucoup préférable au vieux, bien que ce dernier puisse avoir quelques qualités supérieures. Le jeune homme part gaiement à la bataille ; rien de sérieux ne le retient encore à la vie, il n'a pas encore appris à ménager sa vie ; il monte la colline sans se soucier du précipice qui se trouve de l'autre côté, il va à la mort ou à la victoire avec le même entrain. N'est-ce pas ce qu'il faut dans ce métier de sang qu'il faut accepter une fois pour toutes ?

Le système militaire français ainsi que celui de la généralité des nations repose sur l'armée active renforcée de sa réserve et comprenant des hommes dans toute la force de l'âge ; l'armée se compose ainsi d'une sorte de force homogène assez nombreuse qui permet aux généraux en chef de demander aux soldats le maximum d'efforts.

Si j'ai donné une si grande importance à ce fait que les soldats modernes doivent être jeunes il ne faudrait pas conclure qu'il en doit être de même pour les officiers et les chefs ; pour ceux-ci l'expérience a une valeur énorme ; l'étude de l'histoire militaire, les manœuvres, les campagnes, en un mot de longs services, seront toujours des éléments qui donneront aux officiers leur vieille et honorable supériorité d'autrefois. Il n'entre malheureusement pas dans le cadre de mon discours trop succinct de vous parler du commandement des armées, bien que cette partie de l'armée mérite encore plus d'attention. Heureusement grâce au talent et à l'énergie d'un grand nombre d'officiers généraux les cadres se sont améliorés d'une façon sensible. Et à ce sujet laissez moi, quoiqu'étranger, m'unir aux sentiments de reconnaissance que tous les gens de ce pays témoignent précisément à l'un de ces soldats organisateurs de votre colonie au moment où il va quitter ce pays, le joyau de votre couronne qu'il a serti dans le fer de vos baïonnettes afin qu'il fût plus difficile de l'en arracher.

Il y aurait encore bien des choses à dire des différents systèmes de recrutement appliqués par les différentes nations, mais tous aboutissent généralement au même résultat. Je désirerai simplement relater quelques souvenirs sur la vie pratique du soldat ; là encore je dois me borner au plus strict minimum. Si toutefois parmi mes auditeurs il devait y avoir des personnes désireuses de connaître davantage je serai toujours heureux de me mettre à leur disposition.*

DETAILS SUR LA VIE MILITAIRE FRANÇAISE.

Beaucoup de gens s'imaginent encore aujourd'hui que la vie du soldat est loin d'être un rêve, que c'est une école d'avilissement et de dégradation morale. Je connais et j'ai connu mainte mère de famille qui en voyant son fils partir pour le régiment le croyait perdu à jamais. Cette opinion individuelle, évidemment fausse, s'accroît encore dans l'idée anti-militariste d'un peuple, et les anti-militaristes sont plus nombreux qu'on ne pense.

Et pourtant laissez moi vous dire que la vie militaire dans les armées du continent, et spécialement en France, puisque c'est elle que je connais le mieux, y ayant passé moi-même trois années de ma plus belle vie, est une vie dure mais pleine d'imprévu et de gaieté.

*On m'a objecté bien souvent qu'une armée composée de volontaires doit forcément être supérieure à une armée où les différents hommes font un service forcé. Je ne dirai qu'une seule chose, le service militaire obligatoire n'est pas bien différent des autres contributions. Je ne sais pas si l'état ou la petite ville de Simla pourrait exister longtemps si elle devait compter sur les rares volontaires.

D'abord je vous ferai remarquer qu'en fait de service obligatoire il ne faut pas entendre un emprisonnement légal du jeune homme aussitôt qu'il a atteint l'âge voulu. La loi tout en ayant supprimé les dispenses avait à sauvegarder de graves intérêts nationaux, l'industrie, les arts, les sciences, la stabilité des familles, etc. Elle a donc accordé des sursis : c'est-à-dire elle permet aux jeunes gens se préparant à des carrières spéciales, aux grandes écoles, de rejoindre le régiment une, deux ou trois années plus tard. De plus elle accorde ces mêmes sursis aux jeunes gens de familles pauvres, aux fils de veuve, etc. Au régiment même on accorde à certaines périodes de l'année des congés de quinze à trente jours aux fils de laboureurs et de vignerons qui peuvent ainsi aller aider leur parents à faire les moissons. Ce que la loi ne pouvait stipuler comme règle générale, l'autorité militaire l'a fait afin précisément de rendre la vie plus supportable et de modérer la rigueur des règlements. Je dois ajouter que beaucoup de ces modifications et de ces adoucissements sont dûs également à l'opinion publique qui naturellement intéressée demandait à grands cris que l'armée devait être non-seulement une école de guerre mais un second foyer, une famille élargie, non remplie uniquement d'un esprit de corps, mais encore d'un esprit de solidarité plus intime que nous appelons l'esprit de famille. Cette idée préoccupe tellement le gouvernement, je dirais même tous les gouvernements, qu'on lit avec une réelle satisfaction les décrets ministériels, les rapports des généraux et des commandants de régiments recommandant à leurs officiers de traiter le soldat avec la plus grande bonté. Et ces conseils ne sont pas demeurés lettre morte : la vie du soldat moderne est loin de ressembler à celle du soldat de 1870, pour ne pas aller très loin.

Il est habillé aux frais de l'État, possède inscrit à son nom quatre uniformes, y compris des effets de guerre tout neufs qui restent en magasin, reçoit des chemises et des caleçons ainsi que deux flanelles. Dans la caserne il a une chambre commune bien aérée et chauffée en hiver ; son lit comprend une pailleasse, un traversin, des draps et des couvertures. A cinq heures du matin en été, à sept heures en hiver, il reçoit au saut du lit une ou deux tasses de "jus" (café), à dix ou onze heures on lui donne une soupe et un rata (mélange de viande, de pommes de terre et de légumes) ; le soir à cinq ou six heures, de nouveau, après ses exercices ou après les marches et manœuvres, un bon plat de viande rôtie avec des légumes, de la salade, et une fois par semaine un quart de vin l'attendent. En hiver les capitaines soucieux de la santé des hommes n'hésitent pas à donner du thé le soir avant le couvre-feu.

En manœuvres on ne prend pas moins soin de la nourriture des hommes : souvent même le soldat préfère "l'ordinaire" des manœuvres à celui de la caserne, parcequ'il reçoit des gratifications numériques plus élevées et il n'est pas rare de voir bouillir dans la marmite de l'escouade un poulet ou un canard. Croyez bien que ces détails qui pourraient paraître ridicules sont tout au contraire quelques-uns de ces facteurs qui précisément attachent l'homme à cette vie qu'il est tenté de considérer trop facilement comme une vie de baigne.

Les autorités militaires n'ont pas seulement pris soin des besoins de la nourriture, ils veillent également sur la santé des hommes à tout point de vue.

La monotonie de la vie de caserne est coupée autant que possible par des jeux de sport, des salles de lecture où l'homme désœuvré peut trouver des journaux et des livres ; il y a une école régimentaire où les illettrés peuvent même apprendre à lire et à écrire si des circonstances spéciales les ont privés de l'enseignement. Les longues soirées d'hiver sont remplies par des conférences sur les sujets les plus divers, faites par les officiers du régiment. Dans ma compagnie, pendant une année où plusieurs acteurs de l'Ambigu de Paris faisaient leur service en même temps que moi, nous avons organisé un théâtre en règle qui fut tellement à la mode qu'on se battait pour avoir des billets, et où de belles dames n'avaient pas peur de s'asseoir, aumiliu des troupiers. Tout ceci encore une fois je le répète, semble bien mesquin ; mais rappelez-vous que la vie est précisément faite de petites choses ; on ne nous demande pas des actions d'éclats tous les jours, mais l'accomplissement d'un devoir minime et continu. Le soldat qui pendant des années s'est accoutumé à faire son devoir avec plaisir, croyez-moi, cet homme saura à l'heure du danger faire courageusement face à l'ennemi. Et combien de fois n'ai-je pas vu des compagnies et même des régiments qu'on savait notoirement gâtés par ces détails insignifiants en eux-mêmes supporter des choses extraordinaires en fatigue, en soif durant des manœuvres très pénibles.

Je pourrais multiplier à l'infini les détails sur cette vie du soldat, mais ces choses sont peu connues par le public ordinaire je dois admettre que mon auditoire les connaît peut-être encore mieux que moi.

Evidemment il ne faudrait pas croire que le soldat n'a rien d'autre à faire qu'à manger et à passer sa vie agréablement ; il lui faut aussi travailler, faire l'exercice journalier, des marches, du service en campagne, du service intérieur, des manœuvres, etc.

Bref le service ainsi compris ne devrait certainement pas effrayer ceux qui n'ont jamais goûté le plaisir de marcher avec de gros souliers, un fusil à la bretelle et un sac sur le dos qui vous écorche quelque fois la peau.

D'ailleurs, voyez, presque toutes les nations sous une forme ou sous une autre ont adopté un service militaire répondant aux besoins du pays ; car ne nous leurrons pas, la même jalousie, la même avidité qui règne parmi les individus et qui donnent lieu aux multiples "struggles" de la vie, ces mêmes raisons sous des noms plus sonores amènent les frottements continus entre les peuples, frottements qui souvent éclatent en rixes sanglantes qui coûtent la vie à des milliers de gens et qui peuvent faire perdre l'indépendance, l'honneur, le prestige et la grandeur à une nation.

Y a-t-il raison dès lors de s'étonner de l'armement formidable des nations ? A qui faut-il reprocher le mal ? Mais il n'y a pas de reproche à faire à qui que ce soit. Nous sommes comme des loups dans notre tanière ; nous avons à défendre notre existence aussi

bien que celle de nos petits (la comparaison est un peu forcée) et nous en prenons les moyens.

Le seul moyen de nous défendre repose donc sur une armée nationale suffisamment nombreuse, fortement entraînée, avec des hommes connaissant leur métier aussi bien que leur devoir. Le nombre en effet n'est pas suffisant, il faut également la qualité. "J'ai cinquante mille hommes et moi, écrivait Napoléon, ce qui fait 150,000 hommes." Sans faire injure à qui que ce soit j'ai vraiment peur que nous ne trouverons pas dans nos armées modernes un homme qui puisse se vanter de valoir 100,000 ; mais je crains presque qu'il n'y ait dans le nombre des hommes qui ne valent même pas un homme. J'ai simplement cité cette parole de Napoléon parce que j'y trouve l'expression exacte de la valeur qu'il faut donner aux qualités intellectuelles et morales des individus à qui est confiée la défense du pays. Je me permettrai encore de rappeler les paroles si sensées du général Capper, qui tout en vous instruisant d'une façon beaucoup plus technique il y a seulement quelques jours, déclarait avec autorité qu'en dépit des cercles, des flèches, des verticales, des mouvements tournants, les qualités morales d'une armée pesaient et pèseraient encore d'un grand poids dans la balance des guerres futures.

La guerre future que sera-t-elle ? oui que sera-t-elle ? Des livres entiers ont été écrits à ce sujet ; les journaux et les revues ne cessent de nous en faire tinter les oreilles des discours retentissants cherchent à nous effrayer, à nous faire réfléchir, à nous amuser quelquefois. J'oserai presque dire moi que la guerre future sera exactement ce que nous serons, nous les hommes qui la ferons : si nous ne sommes pas des hommes à la hauteur de la science, du savoir faire et du devoir, nous serons battus malgré les canons et les fusils dernier modèle. Si au contraire nos armées sont composées de citoyens soldats sachant manier le fusil, sachant supporter les fatigues, la souffrance, sachant tuer et mourir pour leur patrie, suivant ma faible compréhension, je crois encore que la victoire sera de ce côté.

Les succès de la Prusse en 1864, 1866 et 1870 ont montré au monde la supériorité d'une armée reposant sur le service obligatoire, alors qu'en France on avait seulement la conscription ; les unes après les autres les nations ont alors adopté le système par lequel tout homme valide devient le défenseur de son pays. Le Japon a été le dernier à suivre cette voie, et nous savons avec quel succès.

"Une armée constituée par le service universel," disait un savant professeur, Mr. Cairns, "ne peut que représenter la communauté dont elle est tirée ; elle ne peut que partager les sentiments et les inspirations sociaux, politiques et militaires de cette même communauté et ne peut pas manquer son but."

Les armées continentales sont devenues de fait des écoles nationales dans lesquelles est formée après un temps de service relativement court cette grande Réserve Nationale qui est comme un réservoir inépuisable en temps de guerre. De plus chaque citoyen est mis et retenu en contact avec l'idéal et les besoins de la nation ;

et le patriotisme devient réellement une force vivante qui place les intérêts privés après les intérêts de la nation.

Assurément nous ne sommes pas réunis ici aujourd'hui pour nous saturer d'idées guerrières, et je me ferai un reproche de vous laisser partir avec des sentiments pénibles. Je vais donc essayer de terminer avec des idées pacifiques.

Sans doute nous sympathisons avec tous les hommes bien pensants qui prêchent et désirent la paix et la fraternité universelle. Mais je crains que ces temps ne soient pas encore arrivés ; je croirais plutôt (je cite Lord Roberts) que le chemin le plus sûr qui conduise à la paix c'est l'adoption du service militaire universel, je croirais que l'adoption de ce service par toutes les nations sans exception tracera peut-être la route au désarmement général.

Espérons toutefois que les temps ne viendront pas où de tristes nécessités nous forceraient tous indistinctement à prendre les armes. Quand Rouget de Lisle fit chanter au premier bataillon marseillais son fameux chant de guerre un seul cri passa à travers la France :

Aux armes citoyens !

Formez vos bataillons !

La patrie était en danger ; c'était la nation qui se levait ; et vous savez tous quels ont été les exploits de cette nation en armes.

Ce qu'une nation a pu faire il y a cent ans pour garder son territoire et sauvegarder sa liberté et sa grandeur elle pourra encore le faire de nos jours si elle a su s'adapter aux exigences nouvelles de la guerre moderne c'est à dire si elle est une armée nombreuse, jeune, entraînée et conduite par des chefs instruits et capables.

SIR HERBERT RISLEY—

General Beresford-Lovett has asked me to open a discussion on the subject of the lecture, and I suppose somebody must make a beginning, though I am inclined to say to the soldiers, who are present, *Que messieurs les assassins commencent.*

The lecturer has given us a most interesting account of one great and famous illustration of the nation in arms. I should like to say something by way of desultory conversation about the origin of another famous example of the same principle. A good many years ago when I was in Hanover studying, among other things, the Prussian system of local self-government, I became a member of an ancient and select German Club called by the rather odd name of "The Museum Club." The Club went back to the time of our own Hanoverian Kings, of whom it possessed some exceedingly fine portraits presented by themselves. In those days it had among its members many cadets of great English families who, when there was no room for them in His Majesty's Horse Guards Blue, were sent over to Hanover to serve in His Majesty's Cambridge Dragoons, a regiment by the way which distinguished itself in 1866 at the battle of Langensalza, by riding down a Prussian square armed with the needle gun, an exploit, I believe, that stands by itself. When I knew the Club, its members were, I believe, exclusively civil and

military officials. I do not think any one in business would have been admitted. Unlike most English Clubs, it was a highly conversational institution, and every one was supposed to know every one else.

It was through this genial custom that I came to hear what I am about to tell you, for I may say I cannot produce any historical authority. Every one knows—at least every German school boy knows—that Prussia was built up, on the ruins which Napoleon left, by the efforts of three men: Stein, Hardenberg and Scharnhorst. It is so curious that none of the three was a Prussian. Hardenberg was a Saxon, Stein had a tiny principality of his own in Nassau, and Scharnhorst was the son of a Hanoverian farmer. With the two former we are not now concerned.

It is Scharnhorst that I want to talk about. He was born in 1755, and at the age of eighteen was a student at the military school which had been established by the Prince of the little State of Schaumburg-Lippe at Bückeburg near Hanover. The Ruler of Schaumburg-Lippe was a poor Prince but an ambitious one. He realised how, in the turmoil of the 18th century, it was possible for a small prince with a trained fighting force to become an Elector and even to blossom forth as a king. His finances did not allow him to keep up more than twelve hundred men, and that was the strength of his little army. But it had occurred to him that they need not always be the same men, and by a judicious system of universal service he passed the whole of his male adult population through this cadre of twelve hundred, with the result that, had his chance come, he might have been able to put some twenty thousand men into the field, and to render assistance to some bigger power which would have assured to him a share in the spoils. His chance never did come, and Schaumburg-Lippe is now just what it was in Scharnhorst's day, with still less chance of coming to the front. But it was there that Scharnhorst learnt the lesson which he was to apply on a larger scale 34 years later. In 1807, after the defeat of Jena, Scharnhorst was put at the head of a Commission to reorganise the Prussian army. He found Prussia fettered by the condition, imposed in the treaty of Tilsit, that her army should not exceed forty-two thousand men. This condition, intended by Napoleon to cripple Prussia for ever, recalled to Scharnhorst his youthful experiences in Bückeburg.

Like the Prince of Schaumburg-Lippe he said to himself, it is true we can only have forty-two thousand men but they need not always be the same men, and every man who is capable of bearing arms can pass through the cadre and be ready to expand it when the time comes. Accordingly, he abolished the old Prussian mercenary system and substituted for it the modern nation in arms, as we see it now. In doing this he prepared the way for the Völker-Schlacht of Leipzig six years later, and he laid the foundation of the German army of to-day. The story is a curious one and it was natural that one should have heard it in Scharnhorst's own country, in the town where the Scharnhorst Regiment, the 10th artillery, is stationed.

It was told me by an old Hanoverian General, who himself fought at Langensalza and, like many other Hanoverian officers, was compelled by lack of means to take service under Prussia. He went through the war of 1870 with the 10th Army Corps, which has its head-quarters at Hanover, and when I knew him he had retired for some years. He once made to me a remark which I think will come home to the lecturer and ought to come home to us. We were talking about the annexations made by Bismarck in 1866, and he summed up the position by saying *Preussen hat ja einen ganz bedeutenden Magen* "Prussia has indeed quite a remarkable digestion". Let us hope that that digestion may never be exercised on a British Colony. Australia, at any rate, has risen to the idea of the nation in arms. If only England did not lag behind!

Reponse du Major-General Beresford-Lovett au discours de M. Muller-Desroches.

À propos du discours perspicace et éloquent que nous avons eu le plaisir d'entendre, permettez-moi de vous offrir quelques réflexions sur son application aux actualités de la politique anglaise.

Chez nous on n'aime pas admettre la possibilité d'une invasion du sol britannique. Cette idée est si répugnante à l'orgueil traditionnel, que l'on préfère se cramponner à toute autre opinion (qu'elle soit bien ou mal fondée) qui nie cette possibilité.

Ainsi, il y a quelques années, quand un ancien ministre déclara que l'opinion militaire repoussait au point de vue technique toute invasion du territoire, ses paroles furent chaudement acclamées. Nous savons que ces jours-ci les mêmes sentiments encourageants ont été exprimés par notre premier ministre. En somme nos ministres nous consolent en nous disant : Dormez tranquilles, l'armée navale, notre flotte, avec son passé historique si glorieux, ne nous manquera pas. C'est elle qui se charge de l'inviolabilité du territoire et qui protégera nos routes commerciales sur les mers; elle fera le blocus des débouchés ennemis; c'est elle encore, vaillante, instruite et dévouée, qui balayera la Manche et l'océan germanique et qui avec ses croisés sillonnera la haute mer.

Aujourd'hui cette croyance dans l'immunité contre l'invasion, grâce à l'armée navale, est adoptée par le gouvernement et la majorité chez nous; l'entretien d'une armée de terre est donc une chose inutile, un gaspillage, surtout s'il s'agit d'une armée nombreuse, entraînée et assez forte pour pouvoir à tout moment non-seulement arrêter mais repousser toute descente hostile sur n'importe quel point de notre côte.

Cette opinion optimiste cependant n'est partagée ni par les états-majors des grandes puissances continentales, ni même chez nous par un parti influent et croissant à la tête duquel se trouve le maréchal Lord Roberts.

Ce parti-là prétend en effet que l'opinion de la majorité est fondée sur des renseignements fautifs et incomplets, qu'elle repose plutôt sur les traditions du passé et qu'elle est basée sur un sentiment chevaleresque.

esque qui nous berce dans l'idée que nous ne serons jamais attaqués sans provocation, ni frappés par un coup foudroyant qui nous viendrait d'un ennemi qui déclarerait la guerre après avoir fait son coup.

La minorité ne rabaisse nullement la valeur de l'armée navale ; comme la majorité elle réclame une flotte puissante, constamment sur le pied de guerre, égale à toute combinaison hostile à laquelle pourrait se livrer deux flottes rivales réunies.

Toutefois Lord Roberts et ceux qui pensent comme lui n'oublient pas les hasards et les accidents auxquels sont exposés nos vaisseaux sur mer ; ces accidents malheureusement sont absolument indépendants de la volonté des hommes et nous les enregistrons à chaque instant en manœuvres et même par le temps le plus superbe. Comment lutter contre le mauvais temps, les brumes et les brouillards ; comment arrêter les échouements, les avaries aux machines, les collisions, etc. Voilà des raisons qui rendent l'action de la marine très douteuse à un moment donné.

Voilà pourquoi le parti de Lord Roberts préconise, en plus d'une armée navale colossale, une autre armée sur terre pour la défense du territoire, armée qui serait constituée par des hommes pris dans la nation au moyen du service obligatoire.

Cette armée devrait être sur un pied de guerre tel qu'elle serait capable d'écraser sur le sol britannique l'ennemi quelque puissant qu'il soit qui aurait eu la témérité d'y faire une descente.

Ce parti prétend également avoir raison au point de vue économique ; car dès que l'état-major ennemi reconnaîtrait la puissance virtuelle de notre armée de terre et la futilité d'une tentative d'invasion, on y renoncera et son gouvernement cesserait de grossir sa flotte en dehors des limites justifiables et des exigences voulues pour la protection des lignes de commerce maritimes ; alors on cessera aussi chez nous de dépenser pour la marine des sommes énormes, ce à quoi nous oblige en ce moment la politique de la majorité.

Je me bornerai encore à faire remarquer que le service obligatoire me semble l'expression intense de l'altruisme réalisé, et en plus qu'il est essentiellement démocratique et égalitaire. De ces faits il faut convenir aussi qu'un tel service rentre complètement dans le mouvement et l'esprit de l'époque actuelle.

Dès que le service obligatoire sera reconnu comme l'incarnation du plus haut patriotisme, et surtout quand le prolétariat se sera assimilé cet idéalisme, on verra qu'il se fera valoir et adopter. Mais pour cela il faut instruire le public et le mettre au fait de la raison d'être d'un tel service.

Voilà pourquoi je tiens à féliciter notre auditoire. Vous êtes plus capables de vous prononcer sur cette question, de dire "oui" ou "non" après avoir écouté le discours instructif de notre conférencier ; vous l'êtes certainement plus que vous ne l'étiez hier.

Chacun de vous peut dans la mesure de son influence faire de la propagande en faveur d'un idéal patriotique plus élevé que celui qui se borne simplement à payer des impôts.

NOTES ON AERONAUTICS.

BY CAPT. W. M. ST. G. KIRKE, R.A.

As the title of this paper suggests, it makes no pretensions to being an exhaustive treatise of a highly technical and scientific subject. It is hoped, however, that a brief description of what has been accomplished, and the general lines along which research is being conducted, may assist those interested in the development of an art which is becoming of increased military importance.

ARRANGEMENT OF THE SUBJECT.

Part I.—Machines heavier than air.

Part II.—Machines lighter than air.

Part I.

MACHINES HEAVIER THAN AIR.

The advocates of this system of flight very truly remark that everything which flies in nature is heavier than air, and that, therefore, weight is an important factor without which no solution of mechanical flight can be expected.

It follows that to a certain extent they aim at imitating nature. To understand, therefore, the lines along which aeroplanes, etc., are being developed, one must first look at the principles connected with natural flight, and then consider the way in which they have so far been adapted.

NATURAL FLIGHT.

The motions of natural flight may be divided into:—

1. Flapping flight.
2. Planing or gliding.
3. Soaring.

The first two are used by all birds, “planing” as I shall show being only an amplification of one of the motions of flapping flight, whilst “soaring”, which is again an improved form of planing, can only be performed by those having great wing area such as the buzzard and albatross.

FLAPPING FLIGHT.

To start from the ground a bird leaps into the air, wings and tail expanded, against the wind. By so doing it gets a certain amount of kinetic energy which it proceeds to increase by powerful strokes. In flapping it strikes its wings downwards and forwards, thus raising the body which in turn by its fall, helps to raise the wings.

On the up stroke the latter are moved in a forward and upward direction, thus presenting inclined planes to the air which thus

sustains the body. It is the momentum of the body which makes the up stroke efficient and really converts it into "planing", and as no momentum can be gained without weight, it is clear how important a part the latter plays.

The elasticity of the wings conduces to the harmonious blending of the down and up strokes, and enables it to adjust itself to the air streams.

The wing is in fact an elastic flexible screw with a thick anterior and thin posterior edge. Any wing looked at from the front during flapping flight, will present the screw appearance shown in Fig. 1.

Fig. 1.



Beetle.



Partridge.

The wing itself is capable of movement on two main axes at right angles to each other. That on axis A (Fig. II) taken in conjunction with the screw formation of the wing, provides propelling power, which in a flying machine is similarly provided by a screw propeller.

Fig. 2.



That on axis B, i.e., the power of altering the inclination of the wing to the air currents, enables it to present its wing as a kite at the most favourable angle to combine sustaining power with minimum loss of the forward velocity imparted by the flapping, i.e., sufficient "lift" with minimum "drift." (The first of these movements (on axis A.) is imitated in Orthopter Machines which design to raise themselves by flapping wings alone.

Flapping without the intervals of planing is equivalent to hovering in nature, and requires far greater exertion than ordinary flight. No use is made of the weight of the bird and no momentum is gained. The disadvantages connected with this form will be appreciated when we say that a sparrow in a sheltered corner can only with difficulty raise itself vertically from the ground over a paling 5 feet high.

In addition to the movements on the two main axes, each feather is capable of motion on two subsidiary axes, C and D. This enables the feather to grip the air on the down stroke and avoid it on the up, thus forming a species of valve.

PLANING.

Assuming that the bird has acquired initial velocity and that his wings are inclined at an angle sufficient to sustain him, it is

evident that he will only be stopped by the resistance he offers to the air. That of his wings, called aerodynamic resistance, is the sustaining force, whilst his body also offers "head resistance" and "skin friction."

All that is necessary to keep travelling horizontally is to do enough work by flapping to counteract these resistances and when not flapping he can plane.

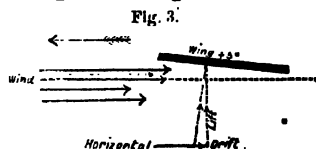
If he prefers to plane in a downward direction the power supplied by his weight falling will be enough. This is called gliding. As might be expected Lemurs which cannot flap can only glide in a downward direction.

SOARING.

The flight of the albatross was for many years a phenomenon for which no plausible explanation could be given. This bird having obtained initial velocity sails for hours, rising and falling at will without once flapping its wings. The same apparently impossible feat is performed by vultures.

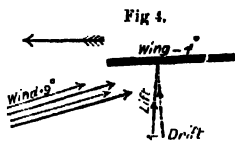
If the air were still, or moving horizontally, it would be impossible, but in ascending currents of air it is feasible.

Assuming that to support the bird's weight, the angle of his wing is 5° to a horizontal breeze as in Fig. 3, it will have to be at the same angle to a breeze ascending at 9° , i.e., inclining down at 4° to the horizontal as in Fig. 4.



Drift is here stopping the bird.

The retardation or "drift" will obviously be less in Fig. 3 than in Fig. 4, in fact it can be shown mathematically to be a minus quantity or to be helping the bird forward. If this minus quantity be greater than the combined head resistance and skin friction which in soaring birds are almost negligible, the bird will be able to fly indefinitely with no exertion of any kind except that of altering the inclination of its wings to utilise the air currents. This explanation only holds for rising currents of air and is not universally accepted as a complete one.



Drift is here helping the bird.

The perfect aeroplane would similarly be one which, having attained a certain velocity and altitude, could utilise air currents to soar for long periods with only occasional expenditure of fuel. Even, however, if we could design wings as perfect, and incline them with the same skill as does the albatross, it is hardly conceivable that we could reduce the head resistance and skin friction of any machine to the infinitesimal amount found in soaring birds.

Aerodynamics, or the science of the laws governing movements of bodies in the air, has been investigated by Maxim Lancaster, and

others. It is obviously a subject of the greatest importance to aviators but here only the fringe can be touched on. Systematic researches into the question will be one of the main features of the new "National Physical Laboratory", as recommended by the Army Advisory Committee.

"LIFT AND DRIFT."

1. Assuming that a plane, A.B., is being driven through space by a horizontal force P . (as applied by a screw propeller), the forces acting on it will be P . and gravity or its weight, W . The air, however, offers a resistance, R , at right angles to the plane which can be resolved into component forces, acting against P . and against W —that acting against P . will be "Drift" that against W , "Lift."

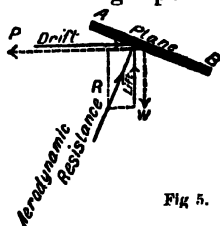


Fig 5.

We wish to place the plane at such an angle that for any given force P supplied, there may be sufficient "Lift" to counteract W , and as little "Drift" as possible. Our engine will then be carrying the weight at the greatest possible speed.

Wind blowing across a properly designed surface has only a small tendency to "Drift," whereas a slightly greater angle largely increases the "Drift," with but little advantage in "Lift," until, when in the vertical position, there is no "Lift" and the maximum "Drift."

2. Apart from the angle at which the plane is set, the "Lift" varies directly as the square of the velocity, (neglecting head resistance and skin friction) and also as the area of the supporting surface. To carry any given weight with a given power, one may increase area and reduce speed, or *vice versa*.

It follows that if a certain area supports a certain weight at a certain speed, increased speed will increase "Lift" and cause the machine to rise. In all the successful aeroplanes there is, therefore, a reserve of power, either available for carrying passengers or ascending to greater heights.

3. Head resistance and skin friction cannot, however, be practically disregarded. The same rules hold for the shape of a body moving in air or water. But having reduced these retarding forces as much as possible by the introduction of fish-shaped forms, there must still remain a certain amount, and this increases with the square of the velocity. Therefore, the gain in reduction of the angle of the plane and consequently in aerodynamic resistance due to increased velocity is counterbalanced by the increased head resistance and skin friction.

4. From the above it will be seen that there are five factors in question, *viz.*, weight, power of engines, shape and area of planes, angle of planes, and speed.

The first three are fixed within narrow limits in the design of the machine, and it follows that only two are variable, *viz.*, speed, and angle of the planes. The easiest way, therefore, to alter speed

whilst maintaining lifting power would seem to be to alter the angle of the planes, whilst to have them fixed, as in most of the present flyers, seems a wrong principle. Most of these latter can only sustain themselves at the one fixed speed for which they are designed. If they increase it, they rise, if they decrease it, they sink.

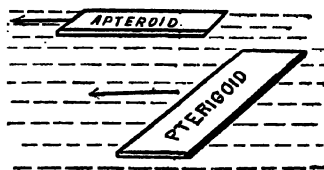
SHAPE OF AEROPLANES.

We now come to the actual shape of the planes.

ASPECT RATIO.

1. The proportion which the spread bears to the depth has a great effect on the efficiency of planes. A rectangle which presents its longer edge at right angles to the resistance of the air (Pterigoid) is more efficient than one that presents its shorter (apteroid). The explanation is that a larger number of air particles are undeflected by the plane in front, and that less of the air stream slips off at the edges. Difficulties of construction limit the length of wings in monoplanes, the maximum aspect ratio being about 11 to 1, rather less than that of some big birds.

Fig. 6.



DIPPING FRONT EDGE.

2. If a plane falls to the ground there is a current circling round each end—Fig. 7. If the plane is forced forward at an angle there is a similar current rising round the front edge—Fig. 8, i.e., the air is rising relatively to the main stream, and, therefore, to make the same angle with this stream as the rest of the plane does with the main air stream, the front edge must be bent down. Our plane will then be as shown in Fig. 9.

Fig. 7.

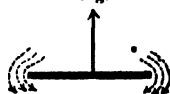


Fig. 8.



3. For reasons into which space does not permit me to enter, this must be converted into a curved or cambered section.

Fig. 9.

4. Sir Hiram Maxim has shown that the shape of the upper surface has a great effect on the lifting power of the planes. He also proved that some planes, placed with their thick edges foremost, actually have less "Drift" than when placed with their thin edge meeting the wind.

5. Our resulting plane will then have the section shown in Fig. 10, and if we compare this with the section of a natural wing, we see that we have arrived at a remarkably close approximation to it.

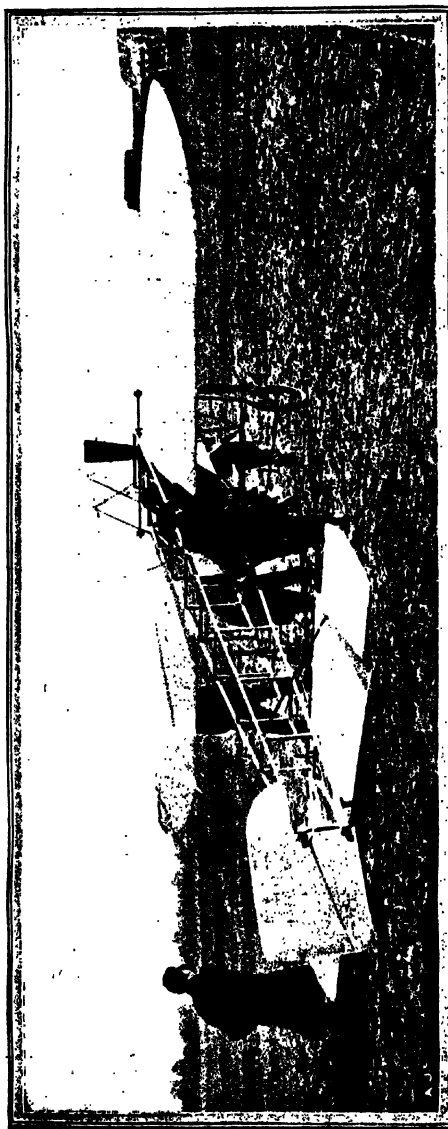
Fig. 10.



This brings us to the practical forms of aeroplane flyers.

The simplest is the monoplane, of which the most successful types are the Bleriot which crossed the Channel (Fig. 11); The Antoinette, (Latham Fig. 14); The R. E. P. (Esnault-Pelterie); The Silver Dart and June Bug (Canadian).

Fig. 11 (a)



BLERIOT No. 11 which flew the Channel. (Rear view showing moveable planes and rudder.) Photo from "Flight."

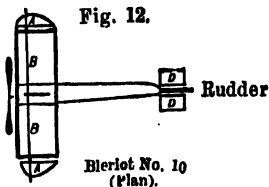
Fig. 11 (b)
Photo from "Flight"



BLERIOT No. 11. Side view of the short-span Bleriot taken on Issy Parade Ground during the experiments.

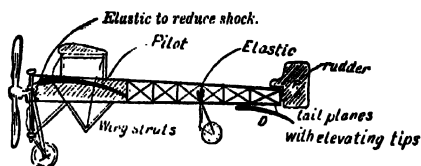
The Bleriot No 11 has the smallest supporting wing area of any practical flyer. To obtain the necessary lift, the machine has, therefore, to be driven at a high speed approximating to 60 miles per hour.

In Bleriot's No. 10, the wings had tips or ailerons (A), moveable on an axis B, by which transverse stability was maintained i.e., any tendency to turn over to one side checked. They also assist turning. Longitudinal stability is secured by the tail planes D.D. (Fig. 12).



In Bleriot No. 11, there are no ailerons, the wings are at a fixed angle and transverse stability is kept by the moveable planes, D.D. on the tail.

Fig. 13.



BLERIOT No. 11 (elevation).

Aspect Ratio 4.65.
Weight with pilot 715 lbs.
Wing area = 150 sq. feet.

Steering is controlled by the rudder R.

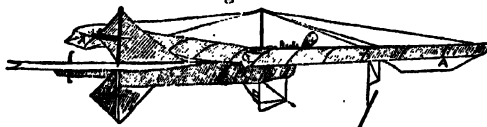
Propulsion is by a tractor screw in front, the usual position in monoplanes.

The Bleriot can start from any level piece of ground having a great advantage over the Wright biplane in this respect (*vide* "Starting," page 74).

It may be mentioned that Bleriot has taken two passengers besides himself in his machine which is a record for a monoplane.

The wings can be easily detached for packing, the whole operation taking only half-an-hour. The centre of gravity is 2 feet below the centre of suspension afforded by the wings, and thus a righting couple is formed which, taken in conjunction with the small wing area, renders the machine less affected by gusts than, say, of the other monoplanes. Bleriot was thus able to forestall Latham in crossing the Channel, and at Rheims is prepared to turn out in much worse weather than the other competitors.

Fig. 14.



ANTOINETTE IV. (Used by Herbert Latham, in his attempts to fly the Channel.) Outline of Photo from "Flight."

Antoinette (Fig. 14) is similar to the Bleriot in many ways.

It has, however, a much greater supporting area, and to the rear edges of the wings are attached small hanging ailerons (A), which adjust themselves to the air currents like the primary feathers of birds' wings. The steering is done by the tail, both elevating and

steering planes being triangular, there are also important differences in the motor which are outside the scope of this article. Perhaps the most important difference, however, is in the position of the centre of gravity and which in the Antoinette is on a level with the centre of suspension. The longest flight with a monoplane, was one by Latham in an Autoinette, of 97 miles, in 2 hours, 13 minutes, 9 $\frac{3}{4}$ seconds, whilst Bleriot holds the speed record for all types of heavier than air machines.



Captain Bugeat's new monoplane "Antoinette VI," with which he has successfully flown at Châlons is equipped with an interesting under-chassis, which is very well illustrated by the above photograph. In order to keep the machine trimmet while at rest on the ground, a pair of steadying wheels are carried on an outrigger framework. There is also, besides the main centre wheel, a corresponding wheel jutting out in front, which serves to protect the tractor screw in the event of the machine landing on the ground nose first.

WE NOW COME TO THE BI-PLANE.

The theory of this system of construction is as follows :—

Assuming that a certain wing area is necessary to sustain a certain weight at a given velocity, it is obviously much easier to place two planes of half the area each, one above the other, than to place the whole on one plane.

The greater the area becomes, the greater advantages in construction does this method offer, and it is therefore particularly adapted to flyers designed to fly comparatively slowly.

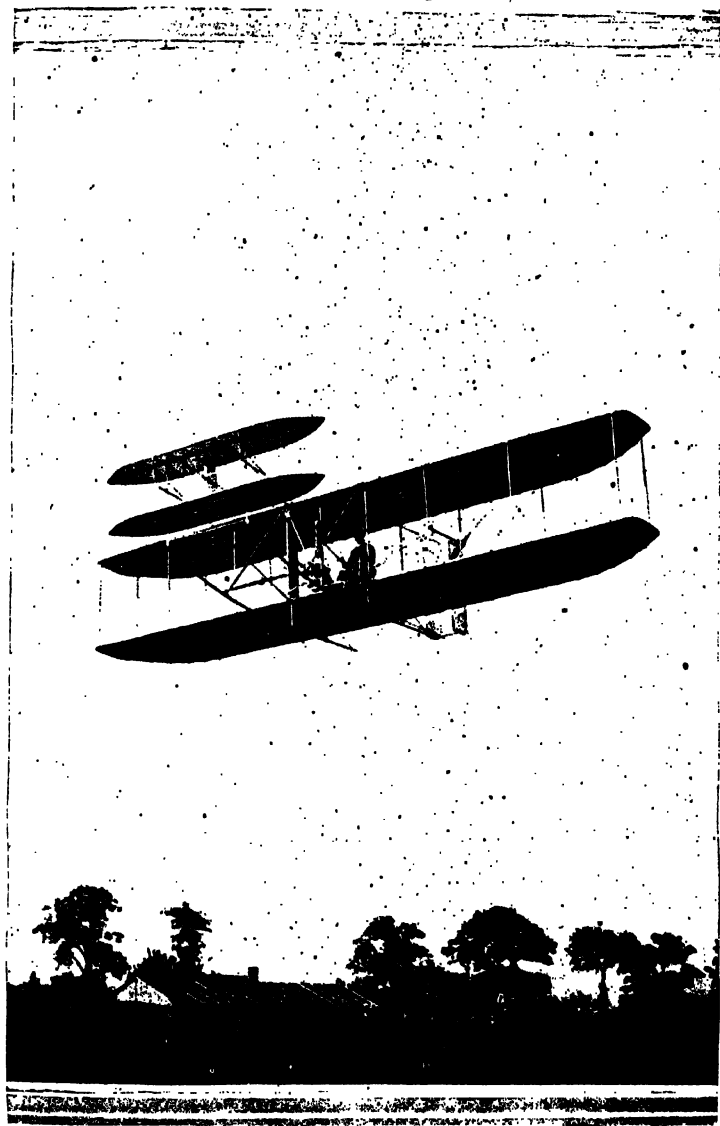
This is always providing that the planes are far enough apart not to disturb the air for each other.

The main disadvantage urged against this form of construction is that head resistance is increased, due to the vibration of the stays which, as we have seen before, increases as the square of the velocity.

Until quite recently all the most successful flights had been made by this type, of which the best known machines are the Wrights (Fig. 15), Voisin (Fig. 19), Curtis—Breguet—Short—Howard Wright, Farman, Cody, etc.

The Wright and Voisin differ in one most important point, *viz.*, Longitudinal stability.

Fig. 15.—Wright Bros. Bi-plane.



Wright Machine consists of two main superimposed planes (A) of the ordinary cambered shape, whilst in front are two small elevating planes (B) for steering up or down.

In rear is a double rudder (C) for steering in a horizontal direction.

There are two propellers working side by side in opposite directions. These balance the twisting effects of each other, and if one stops, the other, unless stopped also, tends to turn the machine over as Wright knows to his cost.



In addition to the steering arrangement noted above, the rear edges can be "warped" to aid in turning.

Warping implies that the rear edges near the extremities are tilted and dipped respectively, thus decreasing and increasing the air pressure (Fig. 17).

Assuming the left wing to have been depressed by any cause as in Fig. 17, then by turning down the tips at A and turning up those at B, the air pressure will be increased at A and decreased at B and the machine will regain the horizontal. At the same time the increased pressure at A will be equivalent to back-watering with the left oar, whilst that at B is feathered and the machine will turn to the left unless counteracted by the rudder. To maintain transversal equilibrium without leaving the straight line, the tips are warped and the rudder turned to counteract them by one circular motion of the lever.



In turning to the right, owing to the left wing travelling faster than the right, the left wing will rise and the right sink, the machine canting over like a bicycle. Unless corrected by "warping" the cant may become too severe and the machine turn over sideways.

The above "warping", therefore, secures transversal stability and turning power, Wright being able to turn in 60 or 70 yards canted over at 30°. Longitudinal stability so far as it exists depends entirely on the skill of the operator. The elevating planes travel through the air carrying practically no load. The main planes in fact are pushed like the feathering of an arrow, feathers foremost, by the propellers in rear. This is a position of unstable equilibrium and the air pressure on the planes tends to exaggerate any pitching or tossing which, if not corrected instantly, would turn the machine head over heels. On it one must first learn to fly, automatic stability not being aimed at all up to date, though the Wright Bros. have lately patented an automatic stabilising device, of which we may hear more anon.

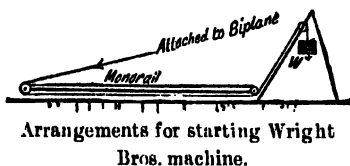
Starting.--To start the Wright bi-plane a monorail is used in order to get the initial velocity necessary to raise it off the ground.

The fall of the weight W , pulls the machine along the monorail as shewn in Fig. 18. This necessitates the provision of the apparatus at any point from which it may be desired to start. On the other hand the weight of the wheels on the machine, etc., is saved.

Still, no machine, which cannot start from any level piece of ground, has much practical utility, except for board ship work for which the Wright is eminently suitable.

The record flight with one of these machines is about one hundred miles in two hours and twenty minutes. Some eight hundred are being manufactured in France, and others in England and the War Office proposes to acquire a specimen.

Fig. 18.



Arrangements for starting Wright Bros. machine.

Fig. 19.
THE VOISIN BI-PLANE.

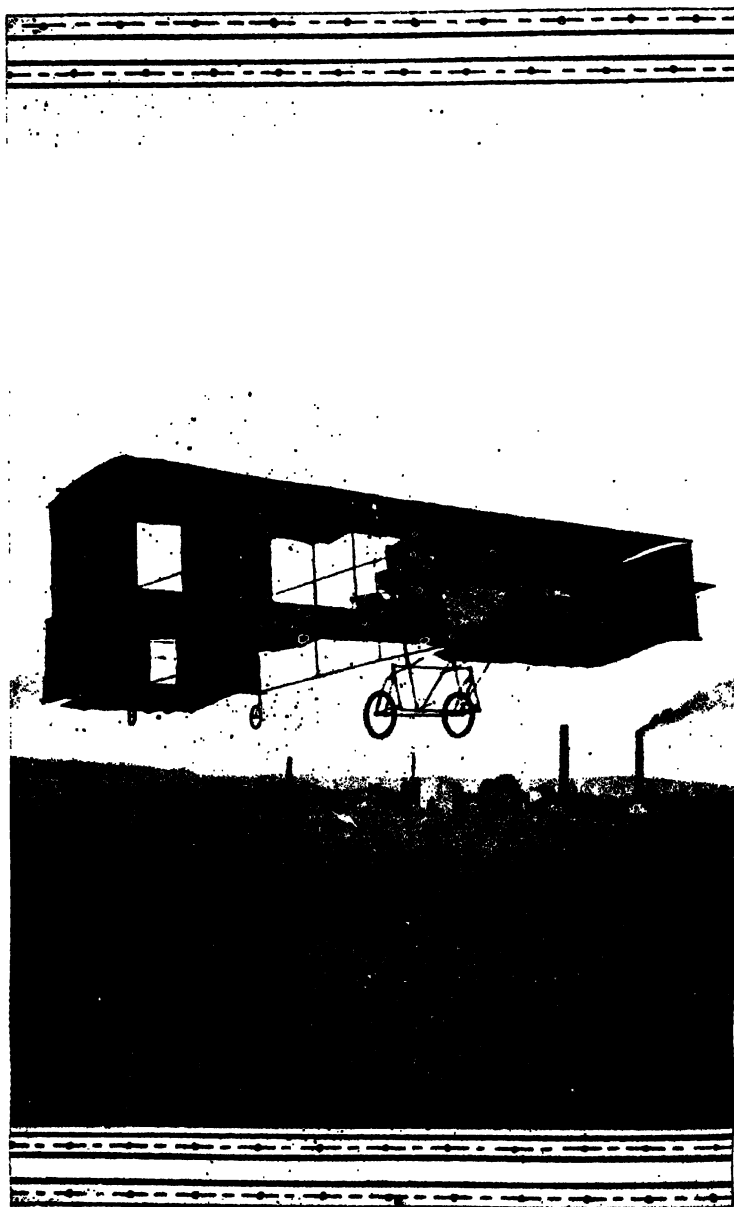
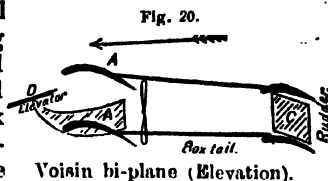


Photo by "Flight".

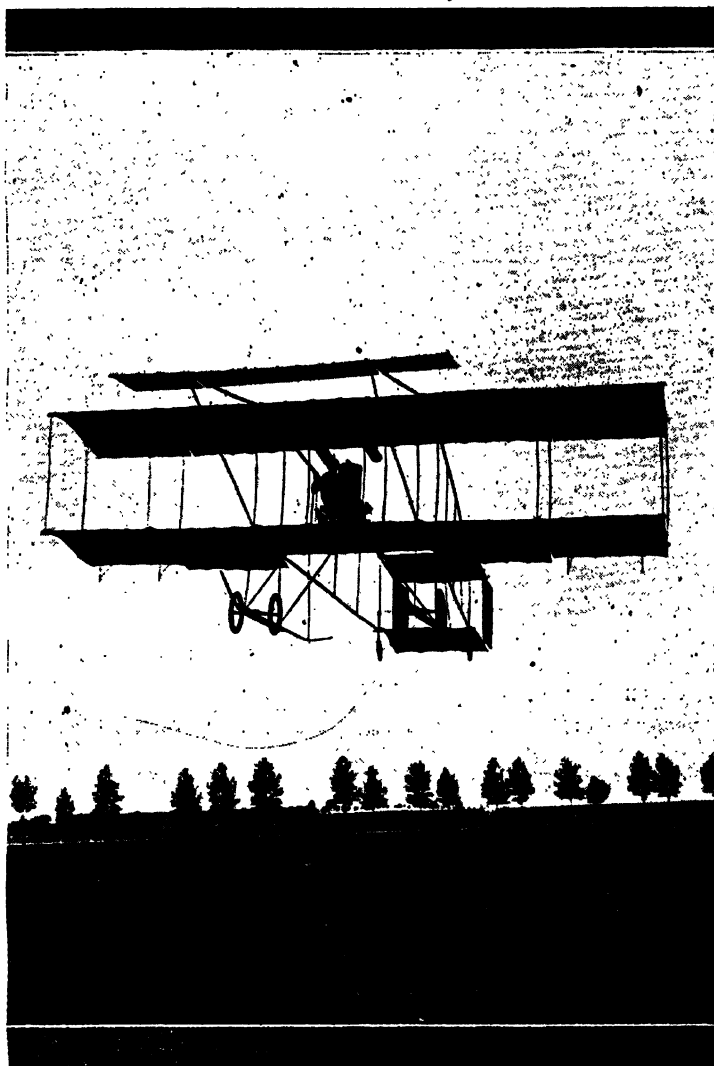
The Voisin, similar in general appearance to Wright's machine, having two main planes A, A (sometimes boxed in at the sides as in illustration) and elevator D, but it has a tail of the box kind designed to produce that longitudinal stability which is wanting in the Wright.



The main planes cannot be warped and, therefore, the lateral stability is automatic, but it cannot turn at nearly such sharp angles, as there is no means of preventing excessive cant.

Since, however, stability is maintained by the planes D and C operated by hand, it is no more automatically stable than Wright's machine, but in the hands of a beginner might to some extent take care of itself, in spite of considerable oscillation. Messrs. Delegrange, Moore-Brabazon, Sommer, Farman and others have all made fine flights with these machines, the latter holding the record of 111.85 miles on one of his own machines. The American, Curtis, on a very light machine holds the Bi-plane speed record.

In both the Wright and Voisin, as in other aeroplanes, ability to rise to any height depends on the excess of power available over that necessary for horizontal flight. Wright has the advantage of the weight saved by not carrying any starting apparatus, and also claims that the shape of his planes is the more efficient. The box tail of the Voisin does not carry the weight commensurate to its area, as it acts on air disturbed by the main planes.

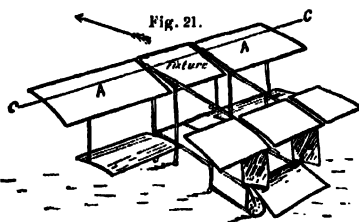


M. Farman on his bi-plane, which won the distance record at Rheims. Photo by the "Aero."

THE BREGUET.

The salient feature of this machine is that the greater portion of the upper main plane A. A. can be moved, on the axis C.

- (1) To be in same angle as B. to sustain machine in horizontal flight.
- (2) At increased or decreased inclinations to raise or lower machine.



Breguet bi-plane. A. A., moveable planes.

- (3) Inversely to warp the machine.

No elevator in front is necessary, and the tail planes only act as stabilisers.

The whole is made of tubular steel and can be packed in a space 8 feet by 25 feet and transported in any ordinary waggon.

The principle of canting the main wings is one found in nature, and consequently promises good results.

TRI-PLANES.

A certain number of "tri-planes" or machines having three super-imposed supporting surfaces have been made, but no great success has been achieved with them. As planes affect each other if placed much less than 6 feet apart, the great height of a tri-plane increases resistance and decreases stability.

OTHER HEAVIER THAN AIR MACHINES.

No sketch would be complete without mention of the many other machines designed to fly, the most important of which are the Orthopters or flapping (Greek *orthos* = regular, *pteros* = wing) machines, Helicopter (*Helix* = whirling, *pteros* = wing) machines suspended by screw propellers.

ORTHOPTER.

The De La Hault, Colomb, Vanderberg all design to raise themselves by flapping their wings. It is obvious that if a plane be flapped straight up and down, what is gained at the down stroke will be lost on the up, unless there are valves in it which shut on the down and open on the up stroke. Great practical difficulties are experienced in making reliable valves, and the same applies to gearing necessary to impart a screw or feathering motion to the wings.

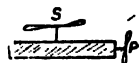
The Lamplough Orthopter has central planes, running longitudinally which sway to and fro, their movement being designed to imitate the wings of a bird hovering. these planes can lift the machine and when fixed act as ordinary aerofoils to assist gliding.

HELICOPTER.

This system is a more practical proposition than the previous ones. The advocates of this form of heavier than air machine claim that it alone can raise itself vertically into the air.

Fig. 22.

In its simplest form it consists of one or more screw propellers (S) on a vertical axis for sus-

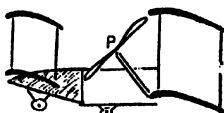


pension, distinct from the propulsive apparatus (P) Fig. 22. An example is the Baylac machine. It may be said that the propeller blades are small inclined planes which by rapid motion convert themselves into large planes, and the idea is therefore only an extension of the aeroplane principle.

In others the propeller (P) placed at an angle serves both for suspension and propulsion and is combined with aeroplanes (*vide* diagram of the Breguet Helicopter (Fig. 23).

Fig. 23.

In others, again, the inclination of the propeller can be altered from vertical to the horizontal, one set thus either lifting, or propelling in combination with ordinary aeroplanes.



The advantages claimed for the Helicopter are :— Breguet Helicopter.

- (1) The weight being below the suspension the machine is stable.
- (2) The gyroscopic action of the fans prevents oscillation. If a heavy wheel be spun round rapidly it will resist any inclination to move its axis, and so strong is this tendency that propeller shafts in aeroplanes have broken by refusing to follow when the machine has been steered up or down too suddenly.

It is obvious that in (Fig. 22) the propeller (S) will have a gyroscopic action depending on its size and weight at right angles to that of P., and that between them they will offer a powerful resistance to deflection by gusts from any direction.

- (3) It is claimed that the sustaining effects of the propeller, even if stopped, will only allow the machine to fall slowly.

A large machine of this class (The Zako Venko) is being constructed, designed to raise twenty people. With the increased power likely to be gained by improvements on the present shape of aerial propellers, there seems a future before this class of machine, particularly in taking over the work now performed by captive balloons, such as observation of artillery fire.

SUMMARY.

The success of aeroplanes in the future appears to depend on the invention of some form of automatic fore and aft and lateral stabiliser. The atmosphere is full of eddies and gusts imperceptible until they actually operate on the flyer. On a favourable day, the breeze may be steady enough to diminish the rapidity of their effect

on the aeroplane, and so give the operator time to work the levers to counteract them. But it is obvious that between the moment when the gust strikes the machine, and the movement of the hand, an appreciable time must intervene, and that given a certain relative velocity, the movement must then be too late to save it from destruction. Further, the human nerve is far from infallible, and flying for any length of time under present conditions subjects it to an enormous strain.

Various attempts have been made, based on gyrostatic action, suspension of a weight acting as a pendulum operating the levers, etc., but none in practice have so far proved quite satisfactory.

The slower the flight, the more necessary does automatic control become, since the greater the speed of the machine, the less comparatively is that of the gusts, and consequently the less their effect, apart from the fact that the greater the speed the smaller the wing area for them to act on.

Increased safety may, therefore, be gained by increased speed, so that there is nothing extravagant in the idea that touring aeroplanes will eventually be normally doing their 100 miles per hour.

An improvement in motors will also be necessary, as those at present in use cannot be relied upon for continuous flights of more than two hours.

From a military point of view, such high speed machines would be valuable for offensive and defensive purposes, particularly against other flying machines, but to fulfil their main rôle with a field army, viz., reconnaissance, they must be capable of hovering or circling at slow speed for a considerable period, to enable the necessary observations to be made. Planes, however, fixed at a certain angle for a certain velocity, confer little or no latitude in speed, and the solution would appear to be rather in a machine, the inclination of whose planes could be altered inversely as the speed, so as to provide the necessary sustaining power from, say 10 to 100 miles per hour.

Fit such a machine with an automatic stabiliser and the aeroplane would at once assume overwhelming importance.

At present, far from being able to make accurate observations or blow up magazines the aviator is fortunate, who can blow his nose without mishap, whilst to carry a passenger, seriously limits the height to which the machine can rise; at best, only about 1,000 feet, or equivalent to a nice driven bird for a small bore rifle.

Such a machine would render the air quite untenable by "Dirigibles" which could never hope to attain anything like that speed, nor probably the altitude to which it would enable the aeroplane to rise.

Practically, the only advance made in the last 25 years, has been due to the substitution of the petrol engine, for the steam engine, and consequent immense saving in weight with increase of power. The practical experience of flying which it enables aviators to gain should be of immense advantage in solving the remaining aerodynamical problems. After all every bird has to learn to fly.

(To be continued.)

TRANSPORT REGISTRATION, ITS HISTORY AND ITS WORKING.

BY CAPTAIN IVAN BATTYE, "Q. O." CORPS OF GUIDES.

Our subject is one about which so much ignorance and so many false ideas are prevalent, that no apology is requisite for the desire to enlighten our brother officers of the Army in India.

Without going further back than 1878, the transport difficulties of the campaigns in Afghanistan in 1878-79-80, in Bajaur and Chitral in 1895 and around the North-West Frontier in 1897-98, were of such a nature that it became necessary to give the matter some special consideration. Previous to 1897-98, the Army in India had been provided with little or no organized transport in peace time, nor was there any satisfactory legal authority for registration or impressment to provide such transport as would be required by the most moderate force on mobilization.

It is true that indiscriminate impressment of transport in time of need was sanctioned by the old-established customs of the country, and was looked upon by the people as an existing necessary burden.

But the operations of such impressment, during the long continued and rapidly succeeding expeditions of 1878-79-80, of 1895 and of 1897-98, led to so much injustice, confusion and unnecessary expense that the need for some legal organization became apparent.

Impressment usually fell into the hands of the lesser village officials, Tahsil chaprassis and village lambardars and chaukidars, so that the animals obtained were of the poorest quality, being generally the property of those who could least afford the "douceurs" that would have sufficed to purchase exemption.

Prices paid in the hurry and confusion of mobilisation, were out of all proportion to the quality of the animals obtained.

At times, even, owners whose animals had escaped impressment appear to have obtained payment for those of others. The utmost confusion and injustice prevailed, and accounts referring to ownership, purchases or compensation were, in some cases, not settled for several years after the completion of the expeditions concerned.

It was more than evident that system, law and organization were most essential.

A series of committees, in which the views of experienced civil and military officials were given full consideration, culminated in the Punjab Military Transport Animals Act, I of 1903, and Punjab Government Gazette Notifications Nos. 351, 352 and 353 of 1st December 1903.

Meanwhile, a system of enumeration of transport animals had been started in 1900, in order to ascertain the resources of various localities in particular classes of animals fit for military purposes. Enumeration Officers, selected from regiments of the Indian Army, were set to tour the civil districts allotted to their charge and to ascertain, as accurately as possible, their resources in animals fit for purchase or hire as siege train or draught bullocks, camels, mules, riding, draught and pack ponies and donkeys. These enquiries necessarily occupied considerable time, but were ably and loyally carried out with the co-operation of all concerned.

Under the provisions of the authorities quoted above, the enumeration and registration of transport animals and carts throughout the Punjab was placed in the hands of Collectors or Deputy Commissioners of districts, assisted by a number of regimental officers of the Indian Army employed as Transport Registration Officers, first styled "Enumeration Officers."

It now became possible, in March 1904, to fix allotments of every class of transport animal to be registered in each district. The numbers for which each Collector thus became responsible, were published to those concerned under Punjab Government Letter No. 111 (Home-Military), dated 12th March 1904.

The Punjab Military Transport Animals Act, I of 1903, was made applicable to the North-West Frontier Province by Chief Commissioner's Notifications Nos. 472, 473 and 474-G. of 8th March 1904. Transport Registration was now a recognised system providing, on paper, an organized transport for the movements of a large army and dependent for its efficiency and success on the efforts, in peace time of Collectors of Districts and "Registration Officers".

The latter were military officers, capable of estimating the quality of agricultural and other transport animals from a military standpoint, and specially enjoying the status of Assistant Commissioners for the purposes of transport registration.

Thus, by the year 1905, the whole of the Punjab and North-West Frontier Province had been divided into a number of "Registration Circles" for the registration of transport animals and carts.

Each circle was fully registered by one Registration Officer, with the assistance of Tahsildars and a number of Registration Assistants.

A Registration Assistant is usually in charge of the registration of transport in one "Sub-circle" composed of one or more *zails* comprising a number of villages and is necessarily, as a rule, a gentleman of considerable influence and position, as he is not paid for the work he does and his duties require considerable energy, tact and integrity.

The sum of Rs. 20,000 is allotted annually for rewards to Registration Assistants and others in connection with the registration of transport in the Punjab.

This sum is not intended to be looked upon as payment for work done, but the small sums so made available in each district, together with occasional awards of titles, *khillats* and *sanads* serve

as an incentive to such men as are loyally anxious to serve the Government.

Registers of transport animals are kept in triplicate, one copy with the Registration Officer, one with the Tahsildar and one with the Registration Assistant.

In these registers are recorded full particulars regarding each registered animal, sufficient for complete identification.

It will be understood that as owners of registered animals receive no fee or compensation, there is no restriction on, or obligation to report, deaths, sales or losses. Registration Assistants are continually occupied in making enquiries and in reporting and replacing casualties in order to keep up their particular quota of animals to be registered.

Tahsil copies of registers have to be constantly kept up to date, entailing a certain amount of work on the clerical staff, whilst the transport registration work in a Tahsil never runs smoothly and continuously unless all concerned are made to realize that the Tahsildar takes a personal interest in Transport Registration as one branch of his manifold civil duties.

Until March 1908, a Registration Officer was usually in charge of some two or three civil districts for transport registration purposes, and was required to personally inspect each registered animal once during the course of the year.

From the 1st April 1908, the registration of mules was constituted a special branch under the direct orders of the Quarter-Master General in India, whilst the general registration of all other species of transport was placed in the hands of Divisional Commanders with two Registration Officers to each Division.

Thus each Registration Officer's charge comprised a very much larger area than formerly, and he was directed to inspect the registered animals of his circle once in three years in lieu of annually.

His office work became also very largely increased, and his travelling and other active duties slightly so.

Previous to April 1908, transport registration had been successfully under the orders of the Directors-General, Supply and Transport and the Director-General of Contracts and Registration. It is not within the scope of this article to enter into the mobilization details with which a Registration Officer is concerned, but the subject will not be quite clear to our readers without some mention of the way in which registered transport is organized.

Calculations were made as to the requirements of a field army in camel corps, bullock trains, pony cart trains and mule corps. The figures arrived at were compared with the results of the work of Enumeration Officers, and certain trains or corps allotted to each district.

Thus, Registration Officers are responsible for the allotment of each registered animal to some particular corps, train or cadre, and are required to make and periodically revise full detailed plans for the mobilisation, collection, acquisition and organization of all the transport units so allotted to their respective registration circles.

As animals and carts would be of little use without their proper proportion of personnel, the Registration Officer is also charged with the preparation of plans for provision of the various classes of personnel that would have to be enrolled on mobilisation.

The detailed inspection of not less than 30,000 animals in three years, and the careful registering of each one, perhaps several times over as casualties occur, with the checking and supervision of Tahsildars' and Registration Assistants' registers, entailing a special visit to each Tahsil at least once during each cold weather, keep a Registration Officer very busy during the eight months of the touring season.

Four months of the hot season, known as the "Recess," are well filled with details of office work which cannot possibly be kept up-to-date when the touring season is used as it should be.

Detailed inspections of registered animals are held at as many centres in each district, as time and local conditions will permit in order to lighten, as far as possible, the burden of the owner.

But the number of inspecting centres are necessarily limited and in some districts, where there are large, thinly populated areas, owners must sometimes be absent from their homes for a whole day or more.

The fact that such an inspection only comes once in three years for any one particular animal, together with the efforts made to so arrange inspections that an owner seldom has to go more than five or six miles from home, does much to prevent any possible dissatisfaction.

A Registration Officer in charge of the registration of transport in several districts, in which local conditions vary as much perhaps as do the desert stretches and Baluch population of Dera Ghazi Khan from the more civilized people and cultivated reaches of a canal colony, will need to exercise much discrimination and local knowledge in choosing times and places at which to hold inspections.

To the regimental officer, whose ordinary duties do not bring him much in contact with the agricultural classes and who, perhaps, has the vaguest ideas as to their lives and customs and little or no knowledge of the civil administration of India, the roving life of a Registration Officer is full of interest and instruction.

A few years' employment in transport registration, if taken in the right spirit, will teach much that should prove invaluable to officers of an army so largely recruited from those very classes with which a Registration Officer chiefly has to deal.

His work is such as to bring into play the utmost tact and patience, and requires an accurate knowledge of the working of the peasant mind.

The system of transport registration, about which we have endeavoured to enlighten our readers, is that existent in the Punjab and North-West Frontier Province, these being the provinces likely to be called upon to furnish transport in the first instance in the event of any mobilisation on a large scale.

The systems in force in the United Provinces of Agra and Oudh and elsewhere, are less detailed and not so closely organized, or supervised, no actual registers are kept and control is, consequently, not quite so effectual.

Authorities necessarily differ considerably as to the amount of detailed control that is most likely to have the required results at the moment of mobilisation, and only an actual test can prove which opinions are the best founded.

But there can be little doubt that transport registration is a step in the right direction, however much opinions may differ as to the details of the system.

Finally, as "all work and no play makes Jack a dull boy," a word about the recreations open to a Registration Officer may not be out of place.

The company of his fellows and the joys of polo, racquets and dancing being usually denied him, if he means to do his duty thoroughly, he must perforce turn his attention to those of the chase, shooting, pigsticking, fishing and other such delights of the open-air life of camp.

These he will find in quantity sufficient to fill up all his spare time, whilst their pursuit will afford ample opportunities for closer social intercourse with the very classes with whom his work brings him most in contact.

Thus duty and pleasure may go hand in hand, each helping the other, whilst the Registration Officer learns to know and appreciate the manly qualities of the Indian peasant and to understand his point of view in the affairs of every-day life.

THE STRATEGY OF THE SOUTH AFRICAN WAR UP TO PAARDEBURG.

A lecture delivered at the Indian Staff College.

BY CAPTAIN C. F. ASPINALL, ROYAL MUNSTER FUSILIERS.

Since war is but an instrument of policy, it is essential, before discussing the strategy of a campaign, to consider the political events that led up to hostilities; and in the case of the South African War this is of more than usual importance. It is, therefore, proposed to approach the subject of this paper by briefly outlining the history of the two Dutch Republics, up to the time we found ourselves drawn into hostilities with them in 1899.

Cape Colony was first visited by the Portuguese; but these pioneers were soon followed by the Dutch, who landed in Cape Town in 1652. The Dutch were in turn followed by some French Huguenots, and these three races intermingled and spread over the country undisturbed for the next hundred years.

In 1806 Cape Town was captured by the British under Sir David Baird, and in 1814 our Government purchased the Cape Colony for £6,000,000.

Unfortunately, no mention was made of how far north our new purchase extended. Three sides of it were bordered by the sea, but the fourth side was undiscovered country—and herein lay the germ which bred all our future troubles.

Between 1814 and 1830 large numbers of British colonists flocked to South Africa, and then arose the first serious quarrel between Boer and British. Our Government objected to slavery; the Boers swore by it as the only means of existence. In 1834, in spite of Boer protests, all slaves in the British Empire were emancipated, and, as a result, the majority of the Boers trekked away northwards to escape from British rule.

Some of these Vortrekkers spread all over what is now the Orange River Colony and the Transvaal. Another party, after much wandering, found themselves in Natal, where, having defeated the Zulus, they came face to face with what they had marched so far to avoid—namely, the British flag. The Boers had trekked by land, the British had travelled by sea; and a small colony of Englishmen had settled at what is now Durban. A series of skirmishes ensued, in which the British were eventually successful, and the disappointed Boers then trekked north to the Transvaal with a still heavier sense of injury against us. This heading off of the Boers from the sea is an important event in the history of South Africa.

The situation of the Vortrekkers at this time was by no means an enviable one. North of the Vaal River the country was divided into a lot of turbulent little communities, only held together by fear of the native and hatred of the British. South of the Vaal there was no government at all, and disorder reigned supreme. This situation at last grew intolerable to dwellers in the neighbouring Cape Colony, and in 1848 a British garrison was placed in Bloemfontein, and the district incorporated in the British Empire.

The Transvaal Boers now asked us for an acknowledgment of their independence, and this we gave them by the Sand River Convention, in which we acknowledged their right to manage their own affairs, with the one proviso that there was to be no slavery. Thus the South African Republic formally came into existence in 1853.

The following year the other Republic, the Orange Free State, was formed by our deliberate and voluntary withdrawal from Bloemfontein. Curiously enough our action was unpopular with a large number of the inhabitants, who petitioned us to stay, and the British Government actually voted £48,000 to compensate them for our departure.

The affairs of the Transvaalers meanwhile grew from bad to worse, and in 1877 the crisis arrived. There was no money in the treasury; Zulus threatened from the east, and Kaffirs from the north. At this juncture, after an exhaustive enquiry, the British interfered, and annexed the country. This move was by no means unpopular with a large section of the Transvaalers; and Kruger himself was amongst those who took office in the new government.

Shortly afterwards, however, the Boers grew restless; and, as soon as we had crushed the natives, they rose against us in 1880.

The first Boer War is not a pleasant page in our history. A force of 400 British was defeated at Laings Nek and Majuba; and though reinforcements arrived for us directly after, and the game appeared to be in our hands, the British Government took a magnanimous view of the situation, and made peace with the enemy, giving them self-government, but reserving to us the right of suzerain power. This was an unfortunate treaty, as it made the British at the Cape suffer all the indignities of a beaten race.

In 1886, gold was discovered in the country, and the Transvaal was at once flooded with men of all nationalities, English predominating, who largely outnumbered the original Dutch population. These Uitlanders were treated with great injustice by the Boer Government, and their grievances were the immediate cause of the war. In 1893, and again in 1895, the Uitlanders petitioned the Transvaal Government with regard to their treatment, but this only made matters worse; and in 1896, the cup of endurance having run over, the ill-starred Jameson Raid took place.

This raid was in every way deplorable. It naturally made matters ten times worse for the Uitlanders, and, worst of all, it

justified Kruger in importing large quantities of arms and ammunition, "to protect himself against future raids."

Finally in 1899 the Uitlanders appealed to Queen Victoria for protection. As a result, negotiations took place between the two governments, and we did all we could to obtain a five years franchise for the Uitlanders. Throughout the summer, owing to the fact that their large stores of arms and ammunition had not yet arrived from Europe, and that there is little grass on the veldt at this time of year, the Boers fenced with us in such a way that we seem to have hoped for a peaceful settlement. At the end of September, however, their ammunition having arrived, and the grass now being long on the veldt, the Boers suddenly refused all our demands. The Orange Free State at the same time informed us that she would be compelled to adhere to her offensive-defensive treaty with the Transvaal. Finally, on 9th October the Boers despatched their now famous ultimatum. The following day our obvious reply was sent to South Africa, and on the 11th October 1899, the war began.

On this date the Boers were able to put 48,000 men into the field, an infinitely larger number than we could hope to possess for several weeks.

The normal garrison of South Africa at this time was 9,000 men. To this 2,000 had been added in August, and a further 10,000 from India and the Mediterranean had been sanctioned in September. Thus, our total forces in South Africa on 11th October were 21,000 regulars and about 6,000 irregulars, or 26,972 in all. This was 20,000 less than the Boers, not counting any accession of strength they might get from disloyalists at the Cape.

It should be noted that this dangerous situation was not the fault of our home military authorities. Our Intelligence Department had the most correct information of the Boer strength, and, as early as June, the Commander-in-Chief had wished to mobilise an army corps and a cavalry division, but had been prevented by the Government, who feared that any such movement would precipitate a war. This, according to our Official History, they were particularly anxious to avoid, for two reasons; first, because they knew that if we were accused of bringing on the war we should lose the nation's support, and gain the odium of Foreign Powers; and secondly, because they feared that, if a war broke out at once, our weak garrison at the Cape would be overpowered before reinforcements could arrive. It was thus our very weakness at the Cape, which in great measure made it difficult for us to strengthen our military position there. The general situation, in fact, seems another and a very good instance of the effect of letting one's policy outstrip one's military preparations.

The first thing to note about the theatre of war is that it extended over an area about the size of India, south of a line drawn from Karachi to Calcutta. Taking the Boer Republics first, their chief characteristics

Theatre of war.

are scarcity of roads and population, and monotony of scenery. With a few exceptions, the hill features consist of isolated kopjes, useful for look-outs, but too easily turned to make tactically sound positions. Better lines of defence were formed by the rivers, which mostly flow in deep beds, with banks level with the surrounding country, and which were thus hard to reconnoitre.

Turning to our own frontiers, the most noticeable point is the apex of Natal projecting into the Transvaal, inviting invasion, and composed of hilly country admirably suited to Boer tactics. West of Natal lies the Drakensburg range, crossed by several tracks, and by a road and railway to Harrismith at Van Reenen's Pass. Further to the west, between us and the Free State, lay Basutoland, which, owing to the certainty that the Boers would leave that part alone, we could afford to neglect. Then, for 200 miles to the west, our frontier marched with the Free State, separated therefrom by the Orange River, a good obstacle crossed by only three bridges, Bethulie, Norval's Pont, and Orange River Station. From Orange River Station northwards to Mafeking, no better obstacle than a wire fence divided Boer and British territory.

On the coast we had four possible bases—Cape Town, Port Elizabeth, East London, and Durban—each possessing a railway running north. The

Railways.

Cape Town line ran to Kimberley and Mafeking, with a branch at De Aar connecting with the Port Elizabeth line to Bloemfontein, which was in turn joined at Springfontein by the East London line. The East London and Port Elizabeth lines were also connected further south between Stormberg and Rosmead. The Durban line ran to Ladysmith, where it bifurcated—one branch going to Harrismith and the other under Laing's Nek to Pretoria. Lastly, should be noted the important line from Pretoria to Delagoa Bay, which gave the Boers an outlet to the sea not guarded by us.

All the Cape railways were single line and 3 ft. 6 in. gauge, and the steep gradients and distances between stations still further reduced their carrying capacity. The difficulty of guarding long stretches of line made interruption easy.

Taking our own force first, it should first be noted that, there being no railway through Griqualand East, the troops in Cape Colony had to operate from different bases and to be quite independent.

Dispositions on the outbreak of war.

Owing to Natal being our most vulnerable point, most of our troops had been sent there, and we had only 5,000 regulars for the defence of Cape Colony. It was, therefore, evident that we should have to depend on sheer audacity for the protection of our long frontier line on this side, until reinforcements arrived. It was accordingly decided to make Rhodesia, and the line from Mafeking to Fourteen Streams, depend solely on locally raised troops, and to use all the available regulars for the defence of the line Kimberley to Basutoland. Even then we could only hope to hold this line by

bluff; but it was decided that the attempt must be made, both in order to defend the Orange River bridges, and also to encourage the friendly, and overawe the disloyal, Cape Dutch. Accordingly, our regulars were distributed between Kimberley, Orange River Station, De Aar, Naauwpoort, and Stormberg. Their situation, 500 miles away from their base, and with next to no reserves, was undoubtedly precarious, but it was considered that the risk must be run; and after events more than justified these dispositions.

Turning to Natal, the shape of the frontier here was a great difficulty. The apex invited invasion, and yet, if we tried to hold it, the Drakensberg on the west formed a screen from behind which the enemy could issue to cut our communications. This being the case, and our force being so small, it would appear that it was essential to keep our troops massed in some central position, such as Ladysmith, so as to fall on the Dutch columns wherever they issued, even though this might mean a temporary loss of territory. For political reasons, however, a detachment had been sent as far north as Dundee at the end of September, to protect the coal-fields. On Sir George White's arrival to command the troops in Natal, he at once objected to this division of force, and wanted to recall the Dundee detachment to Ladysmith immediately. But the Governor brought such pressure to bear on him, saying that a withdrawal from Dundee would have grave political results, and might lead to the rising of the 750,000 natives in Natal and Zululand, that White unwillingly gave in. Our dispositions in Natal on the 11th October were therefore:—At Dundee about 4,500 men and 18 guns, under General Penn Symons; at Ladysmith about 8,000 men and 18 guns under Sir George White; at Colenso a few Colonials; at Maritzburg a battalion of Infantry; and at Durban a squadron of Cavalry.

The detailed positions of the Boer forces will be given later on, and it will suffice to say here that the commandoes were busy mobilising at their various headquarters, the roughly approximate numbers at that time being 28,000 Transvaalers and 20,000 Free Staters.

Having now described the theatre of war and the political conditions, and having given the approximate strength of the opposing sides, it will be of interest to consider what would have been the best plans of campaign for us and the Boers to adopt.

Plans of campaign.

Taking the Boer case first, it is plain that the most urgent point for them was to make good use of their superior strength during the six weeks that must elapse before reinforcements could arrive from England. If they could deal a decisive blow, and overrun the country to the sea, they might well hope for a large rising among the Cape Dutch, and for the intervention of some foreign Power.

The courses open to them appear to have been:—

- (1) To invade Natal, attack Sir George White's divided forces, and overrun the country to Durban, leaving only small detachments elsewhere.

- (2) To advance into the Cape Colony, secure a rising of the Cape Dutch, and push down to Cape Town, leaving a detachment to watch Natal.

Of these the first appears to have offered numerous advantages. Natal was close to the Transvaal, and could be attacked from left, right, and centre after quite short approach-marches. The country offered them ground well suited to their tactics; it was fed by two lines of railway; and it had a good port at which they could get into direct communication with the outside world. Natal was, further, the most loyal colony of the two, and its capture would mean the greatest loss to our prestige. Lastly, and most important of all, in Natal was our largest, in fact our only, army then in South Africa.

An attack on Cape Colony also offered numerous advantages. The Cape Dutch would require little persuasion to rebel; the British regulars were only 5,000 strong; and a march to Cape Town would have met with little opposition. At the same time there were many obvious difficulties in the way of this plan. Firstly, the Free Staters, who were nearest to Cape Colony, were not at all inclined towards offensive action at that time. Secondly, to bring the Transvaalers to the Orange River meant taking them a long way from their own districts, a course to which they would probably object so long as we had organised forces in Natal and Kimberley. Thirdly, the difficulties of supplying a large army so far from its base, without an organised transport system, would have been almost insurmountable, and would in any case have made a rapid advance out of the question.

It, therefore, seems that an attack on Natal offered the best prospects to the Boers, and it is suggested that the following would have been a suitable allotment of their 48,000 field troops:—A main army of, say, 42,000 to converge on to Natal from three sides, and detachments, totalling 6,000 employed as follows: 2,000 to watch Kimberley and Mafeking; 1,000 on the Orange River border; 1,000 watching the Basutos; 1,000 guarding the Swaziland frontier; and 1,000 to keep peace in Johannesburg, from which place the majority of the hostile population had already been removed. These detachments would have been small, but it is contended that they would have sufficed, for the Boers were three times as mobile as the British; and it was all-important for them to mass every available man at the decisive point.

If the Boers' dispositions had been as above, the war would have been very much like the 1866 campaign, for the Natal triangle projected into the Transvaal like the Bavarian frontier, with Ladysmith for Jicin; Joubert, like Moltke, would have sent only small detachments against the forces in the west (representing the Hanoverians and South Germans), and would have massed his full strength against the decisive factor, White, who, like Benedek, had failed to concentrate and reap whatever advantages are to be derived from interior lines.

There can be little doubt, too, that had they acted in this way, the Boers would have been as successful in their six weeks as were

the Prussians. They must surely have crushed Sir George White with these numbers, and got down to Durban; after which they could have afforded to send a large force to capture Kimberley. Then, with Kimberley and Natal in their possession, an insurrection could easily have been provoked amongst the disloyal Cape Dutch; Cape Colony would have fallen, like ripe fruit, into the Boers' hands, and European intervention would probably have followed to put an end to the war.

As a matter of fact the Boer plan, in broad outline, was something of this nature; but fortunately for us they did not grasp the importance of massing troops at the decisive point and running minor risks elsewhere; they consequently tried to be strong everywhere, and to capture Natal, Kimberley, and Mafeking at the same time. To this fact their failure is due.

The actual Boer dispositions, were as follows:—

Three columns, total strength 24,000, were to invade Natal: one 11,000 strong, under Joubert, from the North, the second, 3,000 strong, under Lucas Meyer, from the East, and the third, consisting of 500 Free Staters, under Prinsloo, from the West; 7,000 Transvaalers under Cronje were to attack Mafeking; 7,500 Free Staters were to besiege Kimberley; 2,000 were left in the North to watch the Limpopo border, and 1,600 to overawe the Swaziland tribes; 2,500 Free Staters were to watch the Orange River bridges; 1,000 were to patrol the Basutoland border; and a fairly large garrison was to be left in Johannesburg.

Parts of this distribution are almost inexplicable, especially the dispatch of 7,000 men against Mafeking, which was a place of no strategic importance, and had a garrison of only 1,000 troops. But the reason is probably to be found in the fact that it was practically impossible to get the western commandoes to consent to serve in the eastern theatre of war, even if the Boer Generals wanted them to do so.

With regard to a discussion of the best plan of campaign for the British, it is a little hard not to be biassed by a knowledge of what actually happened during the opening stages of the campaign. It was, however, plain that, owing to our small numbers and want of mobility, it was impossible for us, until reinforcements arrived, to do anything but remain on the defensive. It would, therefore, appear that the great essential for any plan was that it should be very elastic, and give plenty of scope for modification according to the state of affairs when our army corps should at last reach Cape Town. After six weeks' inactivity it would also seem plain that what we should most want would be a quick and decisive success. Now, nothing could check the growing pride of the Boer (who already fancied himself a superior fighting man to the British soldier) so well as a crushing defeat. It, therefore, would appear that our aim should have been to march against the largest Boer army, wherever it might happen to be. But no plan would have been a good one that did not provide for the contingency of Sir George White not being able to hold his own in Natal.

We will now turn to the actual British plan. It was apparently thought that such an ill-organised enemy as the Boers would have no main army. An advance on the Dutch capitals was, therefore, decided on as being the best way of drawing their scattered forces together and making them fight. For this advance there were two possible routes:—(1) through Natal, and (2) through the Cape Colony and Free State. Of these the latter was chosen in preference to the former, because the terrain was well suited to our tactics and because the route was fed by three railways, whereas the Natal route led through hilly country and was fed by only one line, the carrying capacity of which (owing to the steep gradients) was very small.

Whether we were right to look upon the enemy's capitals as the decisive factor is open to argument, and, judging in the light of after-events, it is submitted that by doing so we made the same mistake that Napoleon made when he looked on Moscow as the decisive factor in 1812. It is true that we eventually conformed to the original plan, and that we eventually won; but the fact that the war dragged on for two years after the fall of Pretoria would seem to prove that that city was not the decisive factor at all.

Our plan also seems to show the danger of under-estimating one's enemy. We thought that Sir George White could protect Natal unaided; our whole plan was based on this assumption; and in consequence, as will be shown later, it fell to bits at the very beginning of the war.

We now come to the actual events of the war. After considerable delay, Joubert and his wings advanced. His plan was that Koch, with 1,000 men, should get in rear of Dundee, and that Erasmus and Meyer should attack that place from north and east. Meyer attacked, and was beaten on the 20th October at Talana Hill. Erasmus was late, and took no part in the action. Our success had no decisive result as there was no pursuit.

Meanwhile, the Free Staters were debouching from Van Reenen's Pass, and White was too weak to drive them back.

The following day White attacked Koch at Elandsplaagte, and this ended in another British success.

On this day Yule, who had succeeded Symons (mortally wounded), was shelled at Dundee, and decided to retire. This, owing to Koch's defeat, and to Sir G. White protecting his flank from the Free Staters by fighting the action of Rietfontein, he was able to do successfully; and the whole Natal force was concentrated at Ladysmith on 26th October.

Thus ended the first fortnight of the war. We had had two small tactical successes, but the whole strategical success had been to the Boers. Their concentration was completing; and owing to his division of force and his lack of mobility, White had been quite unable to deal with their columns in detail. The results of civilian interference had been indeed unfortunate; for to be driven out of

Dundee must surely have had worse political results than to have retired voluntarily therefrom before hostilities began, as Sir George White had wished.

On the 27th and 28th October, the Boers continued to approach Ladysmith, the Free Staters trekking round to the south-east. On the 30th, at the action of Lombard's Kop, White tried to roll up the Transvaalers before they joined hands with the Free Staters but was unsuccessful.

Sir George White now recognised that, owing to its immobility, his force was no match for such a large number of Boers, and that he must either retire, or be content to be besieged. Which was he to do? If he stayed, it meant the wrecking of the British plan of campaign, and a large force to relieve him. At the same time he would probably detain the Boers, and save Natal from being overrun. If he retired, it meant the loss of Ladysmith and all its stores, the loss of the railway junction, and great loss of prestige. Moreover, owing to the majority of his force being dismounted, while the Boers were all mounted, he could, by retiring, hope for little more freedom of action than if he stayed. White decided to stay, and there can be no doubt that by doing so he obviated the serious effect which the loss of Ladysmith might have had on disloyalists in the Cape. In the light of after events, however, it is open to argument whether he would not have been better advised to retire. The Ladysmith railway junction was no use to us now, and the moral effect of retiring would perhaps have been no worse than that of being shut up for several months; and as for the colony being overrun, the Boers got south of the Tugela anyhow. Had he retired south of the Tugela he could have kept as many Boers occupied as in Ladysmith, and General Buller's plan of campaign should soon have relieved the pressure.

The fact that his retirement would have obviated all our losses on the Tugela is not used for an argument, as Buller's difficulties there were far greater than Sir George White could ever have anticipated.

But whether he was right or wrong to stay in Ladysmith, he should, it is submitted, have sent away his cavalry, for they were useless in a fortress, caused much sickness, and were urgently needed elsewhere.

General Buller, who had been appointed Commander-in-Chief in South Africa, reached Cape Town on 31st October, some weeks ahead of the army corps which was now being sent out, and with which we hoped to finish the war. On his arrival he found the situation as follows:—In Natal, White shut up in Ladysmith; small posts at Colenso, Estcourt, and Maritzburg. In Cape Colony, Boer columns crossing the Orange River at Bethulie and Norval's Pont; Kimberley and Mafeking holding out, but the former place already clamouring for relief.

General Buller at once decided that his first step must be to send reinforcements to Natal, for White was, to the best of his belief,

in dire straits, Maritzburg was in jeopardy, and Durban was at the mercy of the enemy. If he ignored Natal, and trusted to his own main advance, in accordance with the original plans, to relieve the pressure indirectly, White's army and the whole of Natal might be lost before he had even reached the Orange River, and this would be so great a blow to our prestige that European intervention might ensue. He, therefore, ordered the first two brigades that arrived (Hildyard's and Barton's) to go to Natal, together with the 1st Divisional Artillery. With these he hoped to safeguard Natal and to join hands with White, after which they could return to Cape Town to join in the main advance, which he still proposed to make on Bloemfontein later on.

At the same time Lord Methuen was ordered north with a Division, formed of the Guards Brigades, the 9th Brigade (formed of various units at De Aar and Orange River), and four naval guns, to relieve Kimberley. After he had performed this task, Methuen too was to return south to join in the main advance.

Meanwhile, Stormberg and Naauwpoort were to be evacuated owing to the Boers' approach, and Wauchope's (3rd) Brigade, sent to De Aar, and Gatacre sent to Queenstown, were to arrange for the temporary protection of Cape Colony.

On 15th November the Boers reached Estcourt; and it was evident to General Buller that more troops were needed in Natal. General Clery was accordingly sent to command there, to be followed by the IVth Brigade (General Lyttleton).

Things, however, daily grew worse, and on the 23rd November Hildyard was attacked at Estcourt, and Barton at Mooi River.

Buller was now persuaded that things were being mismanaged in Natal, and decided to go there himself to put matters straight. At the same time he ordered the 2nd Divisional Artillery there, and also the 5th (Hart's) Brigade. But he fully intended to return and begin his march on Bloemfontein as soon as the Natal knot was unravelled; and he left his Headquarter Staff in Cape Town to make preparations for the advance.

Though relief is more often given by indirect than by direct help, the situation in Natal at the time of

Comments.

Buller's arrival was so precarious, and so many weeks must have elapsed before he could have brought any appreciable pressure to bear in the Free State, that it is impossible to think that a strict adherence to the original plan of campaign at that time could have been successful. It, therefore, seems that Buller was entirely right to send reinforcements to Natal as soon as they arrived; but the fact that he imagined that two brigades would be strong enough for their allotted task shows that we were still greatly under-estimating the fighting value of the Boers. The despatch of Lord Methuen to relieve Kimberley appears less justifiable, and shows how hard it is for a General to resist popular clamour for the relief of a besieged town. Kimberley was in no danger at the time, and was after all only playing the proper rôle of a fortress by detaining a larger force than its own garrison.

It is difficult to understand why General Buller persisted in clinging to the original plan of campaign for his main advance, even up to the time when he himself sailed for Durban. At that time his army corps had been hopelessly broken up, and 16 battalions out of 33, 7 batteries out of 15, and 2 cavalry regiments out of 7, had already gone to Natal. Would it not have been better now to have abandoned altogether the idea of an advance through the Free State, to have sent every available man to Durban, to have relieved Ladysmith, joined hands with White, and crushed the main Boer army in Natal? A decisive victory now would have been worth half a dozen victories later on: the mere independent reliefs of Kimberley and Ladysmith would help not at all towards finishing the war, especially since such isolated efforts must be followed by a protracted delay, while the troops were being recalled from east and west for the main advance. Natal indeed was now the decisive point.

We will now leave Buller *en route* to Natal, and turn to Lord Methuen's movements. Facing him at Orange River Station at this time were 2,500 burghers under Prinsloo, who could be reinforced from Kimberley if necessary. Methuen's plan was to advance straight up the railway, so as to bring up supplies for the besieged garrison. Crossing the river, he advanced on the 23rd November, and defeated the Boers at the actions of Belmont and Graspan. Unfortunately, however, he had not enough mounted men to confirm his successes, and the Boers' casualties were small.

In spite of the smallness of their losses, the Boers were dispirited by their defeats, and withdrew to Jacobsdal; and it was with difficulty that de la Rey, who had arrived with reinforcements, induced them to take up a position on the Modder River. Here they were joined by further reinforcements from Mafeking under Cronje, bringing up their strength to 4,000 men.

Meanwhile, Methuen advanced on the 27th, and on the 28th began the battle of Modder River. The fighting went on all day, without any apparent success on either side, but next morning it was found that the Boers had retired with all their guns during the night.

Lord Methuen now decided to halt at Modder River to rest his troops, to wait for reinforcements, and to mend the railway bridge, which the Boers had destroyed. His decision appears open to criticism, for the Boers were now so dispirited that, had he pushed straight ahead, there is no doubt but that he could have relieved Kimberley, left a new garrison there, and returned to the Orange River. It must, however, be remembered that he had lost 1,000 men in his three engagements, and had fought under entirely new conditions. Further, until the bridge was mended, he could not remove the women and natives from Kimberley, according to his orders.

We must now turn to note events in Cape Colony with Gatacre. This General had reached Putter's Kraal, 30 miles south of Stormberg, on the 27th November. His position was a difficult one. The Boers threatened to come between him and French at Naauwpoort on his left; they were also threatening Queenstown, on his right rear, from Dordrecht; the whole country was seething with disloyalty; and the General was besieged with applications for protection from all the loyal farmers in the district.

Gatacre rightly judged that his only chance of stemming the tide of invasion and rebellion was by a counterstroke; and he decided to capture Stormberg by a night attack. On the evening of the 9th December, therefore, he made a night march, and attacked the next morning. Unfortunately, the attack was a failure, and we had to retire with a loss of 600 prisoners. Luckily the Boers did not pursue; and General Gatacre now fell back on Sterkstroom.

We will now return to the Modder River. By the 9th December Lord Methuen had been strengthened by the arrival of the Highland Brigade, and the bridge over the river had been repaired. Information showed that the Boers were holding a position across the railway at Magersfontein.

Owing to lack of water on his flanks, and to fear for his communications, Methuen decided to make a frontal attack. After a preliminary bombardment on the 10th, he accordingly attacked on the 11th. He was not successful, and was forced to retire across the Modder with a loss of 970 killed and wounded. Luckily the Boers were again unenterprising, and there was no pursuit.

At home the news of this defeat was received with dismay and incredulity. But the gravity of the situation was not yet fully realised, and hopes were centred confidently on General Buller, who, it was felt sure, would soon set matters right by scoring a great victory on the Tugela.

The War Office now ordered the mobilisation of the 7th Division.

We must now move across to notice events in Natal. It will be remembered that at the end of November Hildyard and Barton were attacked at Estcourt and Mooi River, and that Joubert with a large force was a short day's march from Maritzburg. If at this time the Boers had attacked boldly, we must certainly have been driven back on Durban. Their dislike of the offensive, however, coupled perhaps by the presence of the Ladysmith garrison on their communications, again came to our aid. At a council of war on the 16th November they decided to retire across the Tugela. Thus, during the last days of November we found our front clear to Colenso; and at the beginning of December General Clery's force concentrated at Frere, where General Buller joined them on the 6th. Our total strength was 2,500 mounted troops, four brigades of infantry, and 44 guns, in all 19,000 men.

Events in Natal up to Lord Roberts' appointment.

The Boers, according to our official history, numbered not more than 20,000 in Natal at this time, of whom 14,000 were watching Ladysmith; so the actual force opposing Buller probably did not exceed 6,000. General Buller's task, however, was no easy one. The Ladysmith and Colenso Boers were within an hour's ride of each other, so that the latter could quickly be reinforced, unless General White made a timely sortie; and the Tugela, commanded as it was by hills on the northern bank, was a serious obstacle.

The usual three courses were open to our General:—to turn the right or left, or to make a frontal attack. The flank moves had the objection that they uncovered his communications, but they offered far greater chances of strategical success. If he advanced by the Weenen road, he could strike the railway in rear of Ladysmith, and might hope to cut the Boers off from the Transvaal, and capture their heavy guns. If he advanced by Potgieter's Drift, he might hope to cut the Free Staters' communications. The Weenen route was furthest away from the enemy, and offered the best chance of surprise if the move was combined with a feint at Colenso. But surprise of any sort was rather hard, owing to the commanding position of the Boers; and the transport difficulties of the Weenen route were great. The Potgieter's route offered less transport difficulty, and General White had said that he could co-operate more easily if this route were chosen. The frontal attack had nothing to recommend it.

Sir Redvers, decided on the Potgieter's route, and arranged with General White to attack on 13th December.

On the evening of the 12th, however, General Buller heard of Magersfontein and Stormberg, and wired to the Secretary of State that, in this serious state of affairs, he could no longer run the risk of losing his communications, and that he would therefore make a frontal attack on Colenso.

Orders for the attack were now issued, and on the 15th December the battle took place, with the results that are well known. But it would appear that it was the General, and not the army, who was defeated, for of 16 battalions in the force, 8 never went into action at all.

The following day Buller wired to the Secretary of State that he had been defeated at Colenso; that he could not now relieve Ladysmith; and that he proposed to take up a defensive position near Chieveley. To Sir George White he helioed that he could not relieve Ladysmith for at least a month, and suggested that, if White could not hold out so long, he had better fire away as much ammunition as possible, and then surrender. Sir George White replied that nothing on earth would induce him to surrender, and that he hoped Buller would persevere.

At home Buller's despairing message, on top of three defeats in one week, created consternation. At a Cabinet Meeting on the 17th it was decided to supersede Buller, and to send out Lord Roberts as Commander-in-Chief, with Lord Kitchener as his Chief of Staff.

The mobilisation of the 7th Division was hurried on; militia and volunteers were asked to volunteer for the front; and the colonies were told that their offers of help would be accepted.

Lord Roberts' appointment brings the war to the end of the first phase. For the Boers as a whole this phase

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had been one of success; but they had lost golden opportunities, and achieved no decisive results, such as they must inevitably have done had they displayed some energy and dash.

The British failure up to this time had been due to our unreadiness, to our underestimate of the enemy, to our failure to keep concentrated, to our lack of mobility as compared with the Boers, and to our Generals allowing themselves to be influenced by their casualty rolls and not pushing on.

Lord Roberts arrived at Cape Town on 10th January 1900, and

Arrival of Lord Roberts.

found the situation in a tangle hard to unravel, for the troops with which he had to strike the decisive blow, now so urgently needed, were split up into four groups over a frontage of 500 miles. The actual situation was as follows:—In Natal, General Buller was still facing Colenso, and had been reinforced by the 5th Division from home. In Cape Colony, Gatacre was still at Sterkstroom, with the Boers facing him at Stormberg. French was near Colesburg, and was meeting with constant success, which was lessening the pressure in other parts of the theatre of war. At Modder River was Lord Methuen with 15,000 men. Kimberley, Ladysmith, and Mafeking were still holding out. Two Divisions, the 6th and the 7th, were on their way from home.

With regard to the Boers, 21,000 were in Natal between Ladysmith and Colenso; 4,000 were at Stormberg; 5,000 were facing French, and 2,000 reinforcements were *en route* to join this latter force. Eight thousand under Cronje were at Magersfontein; 3,000 were investing Kimberley; 2,500 were round Mafeking; and 1,000 were opposed to Plumer in the north. Thus the total Boer strength was about 46,500, of whom probably 1,000 were Natal rebels, and 5,000 Cape Dutch. This is the estimate given in our Official History, but it in no way agrees with Sir Redvers Buller's estimate, for that General telegraphed to the Secretary of State on 9th January that the Boers numbered 120,000, of whom 46,000 were in Natal.

It will thus be seen that, with the exception that South Natal was now practically safe from invasion, Lord Roberts' difficulties were the same as had confronted Sir Redvers on his arrival two months before; they were indeed greater, for our constant defeats had made the situation far more grave. The Boers had gained and our troops had lost *moral*. The rising of the Cape Dutch had spread to an alarming extent, and there were grave fears of European intervention, unless we scored some immediate success. There was indeed no margin left for mistakes. General Buller had been able to make mistakes without doing irreparable mischief; if Lord Roberts made even one now it would probably mean the loss of all South Africa, even if not the ruin of the Empire.

It is just this fact which seems to stamp Lord Roberts as a great General. Before he arrived everything had gone wrong. He landed at Cape Town with everything in as bad a state as it could be, and from that moment everything went right. The fact that we soon had many more troops in South Africa must not be thought the only, nor even the preponderating, cause of his success. All his subsequent movements *looked* very simple, and so, no doubt they were. "Principles of war *are* simple," we are told, "and plans of campaign rarely rise above the plane of common sense". But nevertheless it is only a great General who, torn by conflicting influences, can rise superior to his difficulties and carry out without a hitch his plan of campaign. And how great Lord Roberts' difficulties were, how hard it must have been for him to keep to his settled plan in the face of exaggerated reports from Kimberley, and pessimistic telegrams, news of defeats, and requests for reinforcements from Natal, none but himself can know.

Lord Roberts' first care on arrival was to reorganise the transport, and to raise large bodies of mounted men, by which means alone he knew he would be able to invade the enemy's country.

The Paardeburg campaign.

The next question was where was the decisive blow to be struck? The main Boer army was still in Natal; but Lord Roberts felt, now that Natal itself was safeguarded, that the best results would be obtained by an advance *via* the Free State on Bloemfontein. His idea was that this would relieve the pressure in all other parts of the war, and attract the Boers towards him in ground well suited to our tactics.

The next thing to decide was on which line Bloemfontein was to be approached—from the south *via* Norvals Pont and Bethulie, or *via* the Kimberley line and then across the veldt. Lord Roberts decided on the latter route, because by this line alone did he hold a bridge across the Orange River, and by this line alone, he thought, would he be able to deal with the Boers in detail, defeating Cronje before he was reinforced. If he advanced from the south he felt sure of much opposition on the river, followed by the destruction of the bridges. The western line was in danger of being cut in rear of the army, from the Colesburg direction, but Lord Roberts, knowing the Boers' want of dash, decided to take the risk; and he was justified by results.

Lord Roberts' first idea was to strike the railway near Springfontein; for he felt that this would compel the Boers in the Cape to retire, and that he would then get the two bridges for his supplies. He further thought that by menacing Bloemfontein, he would compel the Magersfontein and Natal Boers to give up their positions.

On the 27th January, however, increasing popular anxiety about Kimberley led the Commander-in-Chief to consider its prompt relief advisable. This did not mean a change of plans, but only a modification; for, after striking east from the railway, a wheel northwards would traverse Cronje's communications, and thus relieve the

town. That task accomplished, the Commander-in-Chief's general idea was to continue his march on Bloemfontein. This shows the advantage of an elastic plan of campaign.

This being the Field Marshal's plan of campaign, his first step was to collect the requisite army on the western line. The problem that confronted him was how to do this secretly, while still letting the Boers think that our general advance would be *vid* Bethulie and Norvals Pont. This Lord Roberts did with rare success; and, as hoodwinking the enemy often plays such an important part in war, it will be worth while noting, in some detail, the methods which our Official History tells us that he employed.

First of all, all movements of troops were made in such a way as to suggest that they were being placed in position for some reason other than the real one. Thus, knowing that the Boers expected us *vid* Norvals Pont, the 6th Division was sent to Naauwpoort, apparently to support General French. The real intention, however, was to bring them west, *vid* De Aar, as soon as they were required—a move that would be well concealed by our troops at Colesburg. A glance at the map will show how conveniently the railways ran for this move.

Secondly, even high commanders were not told the plan of campaign till the last minute. Thirdly, fictitious orders were issued in "clear" and cancelled by "cipher." Fourthly all reporters were muzzled.

Everything worked successfully, and between the 28th January and the 8th February, covered by General Clements at Colesburg and Lord Methuen at Modder River, the Cavalry Division, and the 6th, 7th, and 9th Infantry Divisions (the last composed of troops from Methuen's army and from the lines of communications) were transferred to the western line; while the Boers, quite deceived, continued to reinforce their southern line near Colesburg. Lord Roberts himself arrived at the Modder on the 8th February, having left Cape Town secretly as soon as his plan was ready to be set in motion; and about this time, further to mislead Cronje, he ordered a demonstration to be made against his right flank.

Meanwhile Lord Roberts had received his first set-back in the news of Buller's failure at Spion Kop. This news, coupled with a telegram from the Secretary of State, suggesting that perhaps Ladysmith ought to be abandoned after all, was perhaps enough to make any General waver in his plans. But worse was to follow. Lord Roberts had originally intended to begin his invasion about 12th February, starting from Ramdam. On the 9th and 10th February, however, news of the gravest description reached the Commander-in-Chief. From Kimberley he heard that there was great fear of Mr. Rhodes inducing the Kimberley garrison to surrender unless they were relieved at once. From General Buller he received intelligence of another defeat on the Tugela at Vaal Kranz, and a request for reinforcements.

Lord Roberts now showed his sterling worth. Unmoved by all these disturbing factors he still held resolutely to his own plan of campaign, merely deciding to vary it to the extent of starting two days earlier, and of giving the Cavalry Division the task of cutting through to Kimberley alone.

On the 11th, therefore, the army began to move. On the 13th the Cavalry Division reached Rondevaal Drift on the Modder River, which they held till joined by the 6th Division, accompanied by Lord Kitchener, on the 14th.

On this day the 7th Division reached Wegdraai, and the 9th Division, with Army Head-quarters, was at Waterval Drift. The following day, the 15th, Sir John French made his historic march to Kimberley, which was relieved that afternoon.

During all the days of our flank march Cronje had, with strange persistence, refused to believe any of the reports which reached him about our movements, and remained firmly convinced that the whole army was still on the railway. On the night of the 15th, however, he was at last persuaded of our move, and of his danger, and evacuated Magersfontein with all his force, marching east.

Strange to say, his start eluded Methuen's vigilance, and he even managed to pass the 6th Division unnoticed during the night. When day broke, however, the 13th Brigade, 6th Division, saw him, and immediately gave chase, delaying his rear guard, but not catching him.

French was now recalled from Kimberley to head Cronje off at Koodoo's Drift. The message only reached him on the evening of the 16th, and at this time the cavalry horses were all dead-beat. But French fully grasped the importance of the situation, and, marching with all the men he could muster (one brigade) at daybreak on the 17th, he, after great exertions, reached the Modder River just in time to prevent Cronje crossing at Venter's Drift.

Meanwhile Roberts, who was unfortunately ill at Jacobsdal, had ordered the 6th and 9th Divisions to pursue up the left bank of the Modder; the 7th Division he kept under his own hand at Jacobsdal.

On the night of the 17th-18th February Cronje was faced by a problem. Should he break away, giving up his convoy and transport, or should he dig himself in and wait for reinforcements? There is no question but that he could have broken away, and probably saved half his transport too, if he had tried, for our force in the neighbourhood at that time was only half his strength. But luckily for us he was unenterprising and decided to stay.

Meanwhile, the 6th and 9th Divisions were hastening up the river bank, and, when day broke, discovered themselves, to their great delight, within gun range of the enemy's laager. The battle, and subsequent investment, of Paardeburg now followed; and on the 27th February, Majuba Day, the Boers surrendered.

The effect of Paardeburg was far greater than the mere capture of 4,000 men. Thanks to Lord Robert's plan, in less than three

weeks the whole complexion of the war had changed. The weakening of the Boer forces in Natal, consequent on the despatch of reinforcements to Paardeburg and Bloemfontein, enabled Buller to relieve Ladysmith by the end of the month; and Cape Colony was, at the same time, freed from the majority of the invaders. Finally, all fear of European intervention was dispelled, and eventual British victory assured.

To sum up a few of the strategical lessons we can draw from the South African campaign, the first thing to strike one is how clearly this, like all modern wars, emphasises the advantages that accrue to him who remembers the old fundamental principles of strategy, and the penalties that are inevitably paid by him who disregards them.

Lessons of the war.

Taking the case of the Boers first, we notice the advantage of policy and strategy going hand in hand. The Boers knew that war must come before they could get their ideal of a Dutch South Africa. They seized on the Jameson Raid as an excuse to arm, and step by step they prepared themselves for the struggle. All through June to September, 1899, being not quite ready for war, they fenced with us; and then in October, when all their ammunition had arrived from Europe, when the grass had at last grown on the veldt, and while they still had the preponderance of power, they declared war.

But though they let their policy and strategy go hand in hand, their strategy was of a mean order, and fortunately for us they forgot another and equally important axiom, namely to concentrate at the decisive point; and we have seen how, by their dispersion, they threw away their one chance of ultimate success.

Turning to the action of the British, we see the fruit of letting one's policy outstrip one's military preparations in the dilemma in which we were placed in the early stages of the war. In the division of force in Natal we see the danger of civilian interference, and here too, as in our main operations, we see the mistake of not concentrating one's efforts at the decisive point. The danger of under-estimating one's enemy was also clearly shown, by the inadequate force we originally sent out.

The adverse effect of public opinion, clamouring for the relief of fortresses, was shown, as in 1870. The value of sea power was most evident. Our command of the sea alone made the war possible, and alone prevented foreign Powers from intervening when things were at their worst. Finally, Lord Roberts' plan of campaign, the difficulties he met with, and the unexpected events with which he had to contend, form further evidence of the truth of the saying that it is the execution, rather than the planning of a campaign, which is the difficult task.

Some of the principal strategical lessons, therefore, may be said to be:—

- (1) The necessity for politics and strategy to go hand in hand.
- (2) The necessity for preparation for war.
- (3) The baneful effect of civilian interference.

- (4) The necessity of concentrating against the decisive factor, and running minor risks elsewhere.
- (5) The importance of sea power.
- (6) It is easier to plan than to execute a campaign.

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CAVALRY IN FRONTIER WARFARE.

A Lecture given at the Staff College, Quetta.

By CAPTAIN D. C. CROMBIE, 23RD CAVALRY F. F.

In considering the subject of cavalry in frontier warfare, I propose only to discuss its employment in expeditions on the north-western boundary of India, where our frontier marches with those of Persia and Afghanistan. But I exclude these countries themselves, as a field of operations, from this discussion, as the conditions of fighting there vary somewhat from those of the warfare of which I shall speak; and I shall confine myself to a consideration of our expeditions against the tribesmen of the frontier and of the country they inhabit.

This borderland—with its rocky, precipitous hills, deep stony ravines, narrow tracks leading over difficult passes into restricted valleys—and occupied, as it is, by a cunning, elusive, and, in some cases, comparatively well-armed enemy, presents a theatre of operations probably more unsuited to the mounted arm, than any other in which cavalry is likely to be called upon to act. Let us see what cavalry has done and can be expected to do, in such an inhospitable area—more especially in its mounted rôle.

An idea is very generally entertained in other branches of the service, and even encouraged by some writers on tactics, that cavalry is of little use in the rugged broken country of the frontier. There are some parts, of course, which are practically impassable for cavalry, and where its employment mounted is *nil*. But there are, nevertheless, many large valleys, such as those of the Panjkora, Swat and Kurram rivers, where cavalry can be most effectively employed and where its action has many times been decisive of results. Nevertheless its action is much restricted, not only by the nature of the country, but also by the character of the enemy.

For instance, in this kind of warfare the strategic rôle of cavalry is reduced to a minimum. There is no screen of hostile horsemen to pierce, in order to discover the whereabouts and intention of the enemy's columns; for the enemy has no cavalry and does not move about in columns. There are no mobilisation arrangements to upset. Influenced rather by fanaticism and opportunism than by any known laws of strategy, the enemy is highly erratic in his movements. He carries out the maxim "Scatter to march, assemble to fight" to a degree of perfection probably not foreseen by its author; with the result that, except when about to give battle, he can scarcely be said to exist at all as a fighting force. The Pathan will fight you to-day. To-morrow he will vanish. The day after to-morrow he may present himself at your camp in the peaceful guise of a vendor of fowls and eggs, and in the evening may amuse

himself by firing a few shots into your camp. Then, finding his meagre store of rations running short, he may go off for fresh supplies to his village, to return in a day or two in time to resist the passage of your force over some—to him—conveniently difficult kotal. You cannot use cavalry strategically against an enemy of this description. No useful purpose would be served by attempting to do so.

On the frontier, therefore, the rôle of cavalry is mainly tactical and protective.

An important element—one that is too often lost sight of—which enters into the tactical employment of cavalry, is the fact that frontier tribesmen have a wholesome—some say exaggerated—dread of the mounted man in the open. The moral power of cavalry, always great, is here extreme. And the reason is not far to seek. The Pathan is a mountaineer and has little knowledge of the horse or of riding in his own country. If he rides at all, it is usually upon a small half-starved country pony. In his excursions into British territory he does see horses, but only at a distance, and he does not acquire that familiarity which breeds contempt for them or for their riders. He meets an occasional Indian Cavalry sowar on furlough in his own or in some neighbouring village. Sowars as a class are not remarkable for their modesty and, in the intercourse which arises, you may be sure that the prowess of the mounted arm suffers nothing at the sowar's hands. If the latter, in addition, happens to have brought his horse with him, and if this happens to be a country-bred of brilliant colouring and uncertain temper, the effect is heightened. No one has told the tribesmen, except those of them who are infantry reservists, that the foot-soldier, if he keeps his head, has nothing to fear from the mounted man. They probably would not believe it in any case. Add to all this the fact that by ancient usage, the horseman has a prestige of his own among Orientals, and we see that the average Pathan is predisposed to fear the cavalryman. The result is that when the two meet on service, the former does not keep his head, and suffers accordingly. Experience teaches and confirms what before was only instinctive. The dread which oppresses him—exaggerated or not—is at any rate very real.

I have laid some stress on this fact, as it is of vital importance in considering the mounted employment of cavalry on the frontier.

A very good instance of this moral power is afforded by the action which took place near ZAGAI in the Mohmand country in 1897. A brigade under General Jeffreys was employed in destroying villages. ZAGAI village, almost at the head of the WATELI valley, was one selected for punishment. It lies on the lower slopes of a hill, with low spurs jutting out on either side of it. At 5 A.M. on the 20th September, the brigade started out from camp. Although the enemy were seen hanging about the hills on the left flank watching the march of the troops, there did not appear to be any large gathering of them anywhere; the column was moving up the centre of the valley and thus kept the enemy in doubt as to their real objective. Consequently, no opposition was met with till the troops

approached ZAGAI. Covered by a squadron of the 11th B. L., the brigade marched to within 2,500 yards of the village, when the cavalry reported it to be strongly held, and moved off to the left to protect that flank. As soon as the low spurs on the right and left had been occupied by the Buffs and Guides Infantry respectively, the 38th Dogras marched on the village itself while the guns opened from the centre. The attack was entirely successful and the destruction of the village commenced.

While this was going on, the enemy had been collecting. Some could be seen on the top of the hill behind ZAGAI, while others tried to come across the adjoining valleys on the right and left. Those on the right succeeded, and were soon sharply engaged with the Buffs. On the left, however, a large body of at least 600 tribesmen was collected on the hills and endeavouring to reach the scene of action. But to do this they would have to cross the open ground, and they found themselves unable to do so in the face of the cavalry posted there. Every time they descended to the level this weak squadron—it was only 50 strong—trotted forward. On each occasion that it did so, the tribesmen hurried back to the high ground. The mere threat of the cavalry was too much for them. Finally they abandoned their attempt to cross the valley, and, shouting abuse at the mounted men, they made a wide detour along the hills and did not arrive at ZAGAI till our troops were evacuating it. Thus 50 mounted men had kept 600 Pathans at bay by their sheer moral power.

And you will observe they remained mounted all the time. This is the essence of the whole thing. Had they dismounted it would have been a different matter. I even venture to suggest that had there been 50 infantry in their place, they would have covered the left flank only with the greatest difficulty and some loss.

In this action we find cavalry employed in its familiar rôle of covering the flank of a body of troops in action—doing it, too, most effectively. By an extension of this principle we can infer that even a small body of cavalry, on account of its moral power, would be of the greatest utility when employed in protecting columns on the march as advanced, flank and rear guards. This is, of course, provided that the ground is suitable for their mounted action. (I shall have a few remarks to make on suitability of ground later on.) The work of protecting the flank of a column by piqueting the heights is an extremely harassing one for the infantry, and I wish to lay stress on the principle that cavalry should be freely used for protective purposes whenever, and as often as, the opportunity occurs. After all, columns are not eternally passing through tangis or crossing over narrow kotals, and the secluded valleys that are so frequently met with on the frontier afford an excellent opportunity for relieving the infantry, at least temporarily, of their arduous work. This is especially the case where the line of march crosses a series of deep nullahs, difficult to reconnoitre. A few sowars trotting along

them can quickly search them to a safe distance on either side of the column, and this without in any way delaying its march. -

At ZAGAI we have seen the cavalry employed mounted on the defensive. Let us now consider its action in the attack. There is sometimes a misconception as to the pace at which cavalry can attack in frontier warfare; and the difficulties of the ground are often exaggerated. Cavalry is not always given full credit for its ability to traverse really difficult ground. The pace at which rough ground can be crossed is not fully realised, nor the fact that, for effective action against Pathans, extreme rapidity of movement is not even essential. Of the many successful charges executed by cavalry on the frontier, the great majority have not been faster than a hand gallop or even a canter; very few can have been said to approach the normal pace of the charge.

On the 2nd August 1897, the troops on the MALAKAND forced their way through to the relief of Chakdara. But before doing so, they had to deal with the enemy, who were holding the heights on either side of the CHAKDARA road. The infantry and guns had little difficulty in driving off the enemy, who, in large numbers, poured down on to the KHAR plain towards KHAR village. Two squadrons of the Guides Cavalry, who were concealed behind a spur, charged them and did great execution; the retreat was turned into a rout and the Guides pursued as far as the Swat river. The attack took place over a level plain, where the KHAR polo ground now is, and no doubt the pace of the charge was extreme. In addition to this, the enemy were already somewhat demoralised by the treatment they had received at the hands of the artillery and infantry. From their position of concealment the Guides' attack came as a complete surprise. So circumstances were exceptionally favourable for the action of the cavalry.

But the day before, these two squadrons charged under much more normal frontier conditions. They were ordered to reconnoitre from NORTH CAMP along the road to CHAKDARA and to seize the AMANDARA defile, preparatory to the passage of the column on its way to relieve CHAKDARA. To do so they had to pass between the heights abovementioned. When they moved forward from NORTH CAMP, the enemy immediately detected their intention, and came boldly down to the comparative level to resist them. It was the first occasion, in this campaign at least, that the cavalry were conspicuously in action and they had not yet had an opportunity to assert their moral superiority. The Guides promptly attacked. One who took part in the charge told me that, on account of the nullahs, boulders and bad ground generally, they were unable to move faster than a trot. Yet, with small loss to themselves, they were able to kill 100 of the enemy, who retired to the heights overlooking the road. As the enemy thus commanded the road, the cavalry were unable to proceed and General Meiklejohn abandoned, for that day, his attempt to relieve CHAKDARA. Beyond the fact that the cavalry re-established its moral power—which

afterwards bore good fruit—the action was therefore indecisive of results.

This affair is a particularly interesting one, as exemplifying the scope of cavalry and also the limitations of its action, its effective use on bad ground while the enemy is in the open, and its inability to deal with the enemy when he abandons the low ground and takes to the hills. We have seen how these same heights were quickly carried by the infantry on the following day; and how the cavalry again came into action as soon as the enemy descended on to the KHAR plain.

In the action at SHABKADR, $1\frac{1}{2}$ squadrons of the 13th B. L. charged up the bed of a nullah thickly strewn with stones and boulders. On account of the bad going, they were in extended order and did not attain a speed faster than a hand gallop or fast canter. Yet they swept through the whole of the enemy's front from left to right and suffered few casualties. The enemy began to retire as soon as the squadrons appeared, and our small force of six Companies and four guns were extricated from an engagement, which was beginning to assume the appearance of a disaster.

We may conclude, therefore, that neither great speed nor exceptionally favourable ground are essentials for the successful attack of cavalry. Perhaps it is not over-stating the case, if I say that ground over which cavalry can canter in open order is good enough for its attack against Pathans. Unfortunately, the enemy knows this too, and rarely comes down into the open, when there is cavalry in the vicinity. At NORTH CAMP he did so, it is true, of his own accord, but I attempted to account for this on the score of his inexperience at that time. At LANDAKAI and KHAR he was driven down by the infantry and guns. At SHABKADAR he was enticed down by the quite unrehearsed retirement of our infantry. At ZAGAI he wouldn't come down on any account. Given that the ground admits of it, the other three essentials for the success of the cavalry attack appears to be—surprise, boldness in action—and the most important and most difficult to attain of all three—the presence of the enemy.

I have quoted the action at KHAR in 1897 as an instance of cavalry used in the attack and also in the pursuit. But opportunities for the latter—the pursuit—do not often occur in frontier warfare. The tribesmen, as we all know, prefer to fight on the hillside and, like other irregular warriors, are particularly nervous about their flanks, rear and line of retreat. If attacked from either of these directions, they are pretty certain to abandon their position. They nevertheless rarely take steps to protect their flanks. An almost solitary exception to this habitual omission was the position taken up by the Afridis for the defence of the SAMPAGHA Pass in Tirah, where their flanks were covered by sangars. This is all the more remarkable when we take into account their marked tendency to threaten the flanks and rear of our own troops. The retreat of our force from MAIZAR was one long struggle

to prevent our flanks from being enveloped by the masses of the enemy. The country is fairly open, and had we had cavalry they would greatly have assisted the tactics of ZAGAI over again. But we had no cavalry; the few sowars that were attached to the force were sent galloping to SHERANNI for help.

The value of cavalry in completing a victory and making the most of it, if the ground is suitable, has been exemplified at KHAR. It must be borne in mind that, in our operations against hill tribes, our main object is nearly always to inflict as severe and disastrous a defeat on the enemy as possible, wherever he is met with, to kill as many of them, in fact, as we can, under the circumstances. Owing to the suddenness and rapidity with which Pathans can retreat when they find things becoming too hot for them, it is very difficult for our comparatively slow moving infantry to follow up and reap the full benefit of the defeat. This is the work of the cavalry. It is their duty to pursue, where the ground permits. They should, therefore, place themselves in a favourable position for the pursuit either by holding themselves in readiness on the flank—which after all is the ordinary rôle of cavalry in civilised warfare—or by taking up some position in the enemy's rear where, mounted or dismounted, they can intercept the enemy's retreat. If they can do so unperceived by the enemy, well and good. But it must be remembered that cavalry, moving along the low ground, will probably be in full sight of the enemy on the heights. The latter, always sensitive, as I have said, for his flanks and rear, will quickly divine the intentions of any movement in that direction. This may induce him to abandon his position prematurely, and the cavalry will not only be baulked of their prey, but the enemy will also escape the close range fire of the infantry and guns. In other words, the enemy will have been manœuvred out of his position, which is bad tactics on the frontier.

It is, therefore, advisable that cavalry should not make any pronounced flanking or wide-turning movement except under good and continuous cover; they should rather remain in some concealed position in prolongation of the infantry line of battle and there await the opportunity to pursue. The ideal would be for the infantry and guns to so manœuvre as to drive the enemy across the front of—or at any rate towards—the cavalry, who can then pounce out and finish off the business. This ideal is not always aimed at, and still more rarely achieved. At LANDAKAI, in 1897, such tactics were carried through to an issue which just failed of complete success. A large part of the enemy were cut off from the hills by the movement of infantry and mountain battery on our right, and their only line of retreat was across the open ground and they would be exposed for a mile or two to the attacks of the cavalry. Seeing their danger, the enemy made off so precipitately that the Guides only caught up the rearmost of them as they reached the foot of the hills.

Such perfect combination of the three arms is of rare occurrence on the N.-W. Frontier. Partly owing to the wily, suspicious, elusive

character of the enemy, but mainly due to the configuration of the country, good combination is difficult to carry out. And cavalry have to trust very often to fortuitous circumstances and luck for an opportunity to pursue.

Such an opportunity occurred at WANA in 1894. The Waziris had rushed the camp in the early hours of the morning and, in the confusion that ensued, the enemy had penetrated far into the camp before any regular resistance could be organised. However, the camp was eventually cleared of the enemy, who, estimated at 1,500, were in full retreat by dawn towards the INZAR KOTAL. The 1st P. C., 50 sabres strong, were ordered to pursue.

Whenever a camp is attacked, or sniping becomes so general as to make an attack seem probable, the cavalry should saddle up at once. A proportion of the men stand to the horses, while the remainder are sent to defend their share of the perimeter, which should be a small one. On this occasion no horses had been saddled up, the affair had been too sudden and the general confusion too great, for that. It was found too, when the time came, that all the syces had disappeared, one can hardly blame them, for they are a low class of native and quite unarmed. However, the 1st P. C. were off in pursuit 10 minutes after the receipt of the order. The retreating Waziris had got a good start, but they had a good way to go—nearly 5 miles—before reaching the security of the INZAR KOTAL. The 1st P. C. were soon up with them, and charged, inflicting great loss. After pursuing for some time they were reformed under fire from all sides and charged again, pursuing as before. The ground was beginning to rise and the horses were tiring, so, rallying for a last effort, the squadron charged up a steep slope among olive trees till the ground became quite impracticable, when they dismounted and followed the enemy with their fire till they disappeared over the kotal. The cavalry had inflicted severe loss on the enemy with but trifling loss to themselves.

The free action and free ranging power of cavalry on the frontier is much hampered by several causes. One is the comparative helplessness of a cavalry camp to protect itself from an attack at night, when isolated from other troops. The perimeter of a cavalry camp is larger in proportion than that of an infantry one. The number of men available for the defence of this larger perimeter is small, as a considerable number of them have to remain among the horses to prevent a panic. The horses afford a large mark for the enemy's bullets, and they are liable to stampede. The Pathan has not the same respect for a dismounted sowar as he has for a mounted one, and such a camp would prove an irresistible attraction for all Pathans in the neighbourhood.

There are occasions when small bodies of cavalry could occupy villages at night where they would be comparatively secure from attack. Such means of protection would be employed when the cavalry are sent off independently for sudden raids for a short time and without their baggage.

For their transport is slow moving and would be liable to constant attack if not strongly escorted. To avoid multiplying these escorts, the transport of the cavalry moves with the transport of the respective columns.

We must conclude, therefore, that on the frontier cavalry must be closely backed up by infantry, and in fact must belong to a column of which the other arms form a part. At night it will generally camp with the other arms. So that the range of the independent action of cavalry is restricted to the distance it can cover in a given time. This time is not necessarily governed by the length of daylight, for cavalry can leave camp before dawn. But, unless they intend spending the night in some distant village, they should be back in camp by sunset, for by that time the infantry will have collected round them all the roving spirits in the neighbourhood and the cavalry will risk being waylaid in the dark. Taking an all-the-year-round average, 15 hours out of the 24 is not an unduly large figure to put down for the time that cavalry has at its disposal for independent work. Now, cavalry can cover a lot of ground in 15 hours. Even though the fact that the time spent in going there and coming back—as it were—must enter into our calculations of space, you must admit that the distance that can be covered is considerable. And you must also remember that during this time the cavalry will be able to move with the greatest rapidity—always compatible with the nature of the ground—for it can be disencumbered even of its first line transport, which can come on with the main column.

The value of surprise, so great in military operations in other parts of the world, is equally great against Pathan tribesmen. On the frontier, it is difficult for the slow moving infantry to effect a surprise. The fleet-footed enemy are easily able to keep up with its march, and from their points of vantage on the hills can keep a watchful eye on their movements. But, unfamiliar with horses and having no mounted troops of their own, the mobility of the cavalry does not seem to enter into the calculations of the tribesmen; with the result that they are peculiarly liable to be surprised by cavalry acting independent of the other arms.

There were several instances of this in the KABUL KHEL expedition of 1903. Take the case of GUMUTTI. A column of all arms moved out from BANNU to co-operate in the KABUL KHEL country, with columns entering it from other directions. A squadron of the 1st P. C., which preceded this BANNU column, arrived at GUMUTTI taking its inhabitants completely by surprise. Large numbers of them were outside the walls tilling their fields. This was a great opportunity for the cavalry to cut down many of the villagers before they could regain the shelter of their towers; and had the cavalry been able to do so, there is no doubt that they would have materially reduced the subsequent determined resistance of the defenders. But the instructions they had received prevented them from doing so; and the opportunity was let slip.

On the same day a column from KOHAT crossed the KURRAM river before daybreak and entered the hostile country near BULAND KHEL. The main column was preceded by its cavalry, 2 squadrons of the 3rd P. C., who had received orders to reconnoitre SHEWA, and there to await the arrival of the remainder of the column. The 3rd P. C. arrived at SHEWA at 9 A.M. The country they passed through was excellent for the mounted employment of cavalry, but it was found to be entirely deserted by its inhabitants, who, as the noise of firing very soon proved, had collected in the hills to oppose the remainder of the column and harass their march. The infantry came on slowly, destroying villages and blowing up towers, and eventually arrived late in the evening at SHEWA where they rejoined the cavalry, who, according to their orders, had been inactive since the morning.

A few days afterwards a column proceeded from SPINWAM to destroy some villages at the head of the KAITU river. The cavalry went on ahead, found the villages deserted, placed a cordon round them by piquetting the low hills which surrounded them and awaited the arrival of the infantry. These arrived accompanied as usual by the enemy. The cavalry piquets were then duly relieved by the infantry and the work of demolition commenced. But there had been so much delay that the column did not return back to camp till some hours after dark, a dangerous situation when opposed to an enterprising enemy.

From the last two incidents I make two deductions—(1) that when cavalry works independent of infantry, the enemy will generally remain in the neighbourhood of the infantry, thus affording an opportunity for cavalry to lay waste the country and destroy villages uninterrupted. This they should do much more quickly than infantry and they should consequently be able to cover a wider area; and (2) that in order to do this, they should be provided with sufficient explosives themselves, or should be accompanied by a sapper officer with all the necessary paraphernalia. This could be loaded up on led horses in much the same way as the entrenching tools are at present.

In citing these incidents from the KABUL KHEL expedition, my object has been to show how cavalry can be used independently of the other arms; that its mobility—as always, brings with it facilities for effecting surprise; and that the value of the mounted arm in this rôle is not always perhaps taken full advantage of.

This may be accounted for partly by the paucity of the numbers of cavalry employed in frontier expeditions, and the consequent reluctance of the superior commander to risk such comparatively small bodies of men in isolated action. One rarely reads of more than two squadrons being placed under any one commander. Usually less. The question would be worth considering, whether large numbers of cavalry might not be employed with advantage. The objection to this would be the lengthening of the column that it would entail, and the additional arrangements that would have to be

made for supplies. It must be remembered, however, that in most localities where cavalry can be most effectively employed, the ground will probably be cultivated, so that cavalry can live mainly on the country. Water, however, presents a difficulty, as its presence very often varies with the seasons. Thus, in the MOHMAND expedition of last year, though the cavalry depended entirely on the country for its forage, water was so scarce that probably the numbers of the cavalry could not have been increased.

Cavalry is the only arm that really has any chance of capturing the small bodies of raiders that constantly invade some parts of our frontier. News is generally received in cantonments some considerable time after any definite act of hostility has been committed. So the raiders have an excellent chance, either of getting well on their way back across the border, or of concealing themselves in the country itself, before our troops can get in touch with them. Cavalry and infantry are sent off simultaneously and independently of each other. It is the business of the cavalry either to hold up the raiders till the infantry arrives, or to block their egress out of British territory, or to capture the raiders themselves. A case in point was the capture of Multan's band by the 19th Lancers at Peshawar the other day.

Cavalry is invaluable for keeping up communication between the different parts of a long column; and, owing to its ability to concentrate quickly towards a threatened point, is most usefully employed as escort to large convoys on the line of communications.

Cavalry should not be required to provide piquets for the protection of a camp containing infantry, for, as I have already pointed out, their place is with their horses. Nor, as a general rule, should cavalry be employed in piquetting such hills as are generally met with on the frontier, to protect the march of an infantry column.

The fact, even on the frontier, the cavalry soldier should be parted as little as possible from his horse. He is a mounted man and is trained to act mounted. He is far more effective in the saddle than on foot. On foot he loses all the moral power that his horse and its mobility confers upon him. He should, therefore, act mounted whenever he possibly can—even to stretching a point. It is to emphasise this principle that I have referred solely in this lecture to his mounted action.

By this I do not mean to minimise the value of dismounted action. This is another rôle—and a very important one—of cavalry in frontier warfare.

A PLEA FOR INDIRECT RIFLE FIRE.

BY LIEUT. JAMES BLAIR, THE BLACK WATCH.

"Indirect Fire," a term so well known in connection with Artillery fire, and a form of fire so extensively used during the recent Russo-Japanese war, is a term seldom connected with the rifle; and in fact if mentioned to the average military man, is dismissed as a rule very curtly as being impracticable. But it is doubtful whether this question has been probed to its deepest depth, and perhaps, if this is done, some case may be made out in favour of the hitherto practically unused "Indirect Rifle Fire."

There is undoubtedly great scope for Indirect Machine Gun Fire, but at first sight it seems rather a difficult task to make out a plea for Indirect "Rifle" Fire.

This question presents itself, "Is a conclusion with regard to Indirect Rifle Fire to be arrived at by a close study of indirect fire as carried out by Artillery, and an application of this made to rifle fire; or can 'Indirect Artillery Fire' have no possible connection or comparison with Indirect Rifle Fire?"

Before going into the question of how indirect rifle fire can be employed in battle tactics, it will perhaps be best to go into methods by which indirect rifle fire could be carried out.

Firstly, "Indirect Fire" implies that the firer cannot see the object to be fired at. This condition can be fulfilled in one of three ways:—

- (a) The firer may be so close up behind cover (as for instance behind a wall), as to be unable to see the object to be fired at.

(N.B.—It may be suggested that the firer has only to look up over the wall to see the object he wishes to fire at; but as it is quite possible that the firer does not want to give his position away by looking over the wall, or cannot, owing to the fire being brought to bear on it, this is quite a possible position for men to be in.)

- (b) An intervening object, like a hill, may obstruct the line of sight.
- (c) The object fired at may be so close under cover as to be out of view of the firer, as for instance down in a nullah or on the reverse slope of a hill, both favourite positions for reserves.

To put this into concise form, the obstruction to the line of sight (from the firer to the object fired at) may be either—

- (a) close up to the firer ;
- (b) somewhere about half way between firer and the object fired at ;
- (c) close up to the object fired at.

Secondly, "Indirect Fire" implies firing over this obstacle, which may be situated in any of the abovementioned positions, thus involving a certain amount of calculation of angle and distance, combined with, if possible, observation.

This second condition implies that indirect fire could not be employed by a force continually on the move, owing to the practical impossibility of working out angles and distances for a moving force. This condition, therefore, distinctly limits the possibilities of indirect rifle fire, as it must be confined to use by bodies of troops which are not in motion.

The next question which arises is, "Under what conditions are bodies of troops not in motion?" as it will be under these conditions, only that indirect fire can be used. The answer to this question is :—

- (a) A force in camp.
- (b) A force in an outpost position.
- (c) Troops garrisoning a town, etc.
- (d) Troops occupying a defensive position.
- (e) Troops engaged in a holding attack.

Before going into the practical application of indirect rifle fire to any of these conditions, it will be necessary to go into a few details of how indirect fire is carried out. It has already been remarked that indirect fire necessitates a certain amount of calculation of angles and distances, a condition which prevents its use by bodies of troops in motion, and confining its use to stationary bodies of troops.

It will be seen that, given—

- (a) the angle of departure of the bullet from the muzzle of the rifle, or rather the angle of elevation of the rifle ;
- (b) the angle of descent of the bullet to the ground ;
- (c) the culminating point of the bullet at given ranges in its trajectory, together with the height of its trajectory at intermediate ranges, by ascertaining heights and distances on the actual ground fired over, the course of the bullet can be traced, and its position at any period of its flight can be estimated.

This will best be illustrated by a series of examples ; but before working out the example, a table showing angles of departure, elevation and descent, together with culminating points will be given. These tables are taken from Training Manuals, Appendix pages 52, 53 and 54.

As a first example, take the case of firing over a hill at an enemy on the far side. It may, for instance, be required to fire long range fire at an enemy from behind some obstacle, which is about half way between the firers and their enemy. The occasions on which this kind of indirect fire would become feasible and practicable, are in siege or investing operations. It is quite conceivable that a force investing a large camp or fortified post, might be able to work its way up to within long range fire of the objective behind cover of some intervening hill or ridge; and then, by firing over the intervening obstacle, to cause considerable damage to the besieged, while at the same time keeping completely out of sight.

Similarly, opportunities might frequently be offered to the besieged of bringing long range fire to bear on the attackers, who, in all probability, will have their camp or quarters under cover of some hill, which interposes between besiegers and besieged.

The method of applying the tables given in the foregoing pages may seem a little complicated; but after analysing the system, and after a little practice, very little difficulty will be experienced. Of course its actual practicability has yet to be tested, but it seems, at all events, to be a subject some knowledge of which might prove of value in war. In the present instance, an artificial, or rather 'selected,' line of sight will have to be provided for the firers to aim at with their rifles sighted at the required distance to carry the bullet over the obstacle, and drop it into the enemy on the other side of the hill.

To take an example, suppose the range of the target to be 2,000 yards (this distance would have to be ascertained from a sketch or map, or by reconnaissance, as the intervening hill would prevent range taking) and a hill 30 feet high is 1,200 yards away from the firers. From the table given, it will be seen that at 1,200 yards the culminating point of the trajectory for a rifle fired with sights at 2,000 yards is 206 feet; hence a rifle fired direct at the target 2,000 yards away, would clear the 30 feet hill by 176 feet. But how is aim going to be taken at the target, when a hill 30 feet high intervenes, thus obstructing the view? It is obvious that an artificial aiming mark must be provided, and the most prominent and conspicuous one would be the crest line of the 30 feet hill. It stands to reason that if aim is taken at the crest line of the 30 feet hill, elevation is necessarily obtained in addition to that already given to the rifle by setting the sights at 2,000 yards. Therefore, to fire aiming at the top of the hill with sights at 2,000 yards, would mean that the bullet would go beyond the required range, *i.e.*, would go further than 2,000 yards, thus missing the object it is intended to hit. The question is, how to remedy this.

First of all, when firing over level ground with the sights at 2,000 yards, the angle of elevation on the rifle (obtainable from the table given on p. 54, Training Manuals, Appendix) is $5^{\circ} 14.5'$, *i.e.*,

for practical purposes, say $5^{\circ} 15'$. The angle from the firer to the top of the hill (easily obtainable from the sketching formula, $H. E. = \frac{VI. \times 20}{D}$), will be $\frac{1}{2}^{\circ}$.

This means that as the line of sight has been raised $\frac{1}{2}^{\circ}$ owing to aiming at the top of the 30 feet hill, $\frac{1}{2}^{\circ}$ of elevation will have to be taken off the angle of elevation, to allow of the bullet falling to the ground at 2,000 yards; hence the required angle of elevation will be about $4^{\circ} 45'$, (i.e., $5^{\circ} 15'$ less $\frac{1}{2}^{\circ}$, or $30'$).

Now, again, refer to the table mentioned above, and see what the nearest angle of elevation on the rifle in this column is to $4^{\circ} 45'$, this will be seen, to be $4^{\circ} 43' 5''$, which is the angle of elevation on the rifle when sighted for 1,900 yards.

Hence, in this example, to bring indirect fire to bear on the target, it is necessary to aim at the crest line of the 30 feet hill, with sight set at 1,900 yards. In connection with this it must be remembered that, with rifle sighted like this, there is a margin between the top of the hill and the course of the bullet of some 170 feet, so that this fire could be carried on with a very much higher obstacle than the one mentioned in this example. Of course, the higher the hill (if the crest line is aimed at), the lower the elevation must be. It should also be borne in mind that the crest line is by no means a *sine quid non* as a mark to aim at, as a line of trees, a hedge, or any well defined object would do equally well, only the angle of elevation of the aiming mark from the firer's position must be taken (either by clinometer or Abney level), and the table of angles of elevation applied.

Further, it must be remembered that this is only one of several examples of indirect fire, other examples will be given later.

Objections will undoubtedly be raised, some of which will probably be as follows:—

(a) That it is a very complicated method, requiring calculation.

Undoubtedly a certain amount of calculation is required, and perhaps, when viewed as set forth in this article, it may seem to the casual reader complicated; but on analysis, it resolves itself into a very simple application of the tables given in Training Manuals, Appendix, and a knowledge of the ordinary sketching formula mentioned above. To any one, who, still, after careful analysis of the method of carrying out, considers the process difficult, it is recommended that he should work out a few simple examples with the aid of diagrams, and after an example or two it should become simplicity itself.

As a matter of fact, all that is required to be able to compute the elevation required for using indirect fire are the following:—

Training Manuals, Appendix.

A Clinometer or Abney's Level

A knowledge of the ordinary sketching formula, $H. E. = \frac{VI. \times 20}{D}$

and a little common sense.

Every officer on service, as a rule, possesses the above or at least presumably so, except perhaps the copy of Training Manuals,

Appendix, but it would be very easy, before starting on service, to copy or paste into a note book these tables for reference.

(b) That if a hill is between the firer and the object he is firing at, how is the range to be ascertained?

This is a much more serious objection, and one which it is difficult to surmount; but the difficulty would have to be overcome either by getting the range off a map; or by observation of fire; or by the range being taken from one side or the other of the firing point, from where the target could be seen, and an estimate made of the difference between the range thus taken and the range required. It might even be possible for some one to reach the hill, and find out the range of the target from the hill, and add the range of the hill from the firing point to it, this information being either signalled back or a message sent.

(c) That owing to the firing unit having to remain more or less stationary, such an opportunity (i.e., an opportunity of using indirect fire) would seldom present itself.

But in campaigns of the present day, one often hears of bodies of troops occupying a position and not being able to move for perhaps some hours, and at the same time perhaps not even being called on to fire a shot during that period of inaction. In such a situation as this, it is possible that a knowledge of how to use indirect fire might make this party a very useful factor in the operations in progress.

There are, moreover, occasions, when bodies of troops are purposely in a stationary position, such as when on outpost, in a defensive position, in a siege, etc. One of the maxims laid down for troops so situated, is that all dead ground should be denied to the enemy, and Military Engineering has invented various devices for carrying out this maxim. Surely, indirect fire would be another means of carrying out the same purpose.

It will perhaps be sufficient to give two other examples of cases where indirect fire might be used with effect: firstly, where the obstacle to be fired over is close up to the firer; secondly, where the obstacle to be fired over is close up to the object to be fired at. There are, however, many other instances, which could be quoted, of opportunities for using this indirect fire, provided of course the object to be achieved was proportionate to the trouble involved.

To take the first of the two instances, the case where the obstacle to be fired over is close up to the firer. It might be desired to fire long range fire from behind cover, from behind a wall for instance. In this case an artificial aiming mark would have to be marked on the wall somewhere near the top, and probably the most suitable mark for a line of men firing would be a line of white paint, which might possibly be improved (if time was available), by putting black dots at sufficient intervals to allow each firer to have a dot to fire at.

The angle of elevation of this line from the firer's position would then have to be taken with a clinometer or Abney level, remembering

that if the firer's position is lying, the angle must be taken from a lying position also. Assume this angle to be 2° , and assume the range of the object to be fired at is 1,500 yards. From the table, the angle of elevation on the rifle when sighted for 1,500 yards is $2^\circ 59' 5''$, say 3° . But the rifle has already been given an elevation of $2'$, in order to aim at the line on the wall, so the rifle must be sighted at the sight which has an angle of elevation of $1'$, *i.e.*, from the table, 800 yards (800 yards having an elevation of $57' 5''$ which is near enough for practical purposes, and at all events is nearer than that for 900 yards, which is $1^\circ 15' 5''$).

Lastly, to take the third case where the obstacle to be fired over is close up to the object fired at. Examples of this kind might occur in such cases as when an enemy is occupying a low ridge of hills, behind which or in hollows of which the reserves have been placed. Or an enemy in the open might have his supports and reserves hidden away in a *nullah* or in some convenient hollow in the ground.

To take a more or less simple example to illustrate this case, suppose that flankers have discovered the reserves of an enemy in position are sheltered some 200 yards behind a hill, which is 1,300 yards distant from the firer's position, making the total range 1,500 yards. A party is detailed to bring long range indirect fire to bear on these reserves, the hill behind which they are sheltered having been distinctly pointed out. It is decided to fire, aiming at the crest line of the hill in question. The angle of elevation of the crest line is taken with a clinometer or Abney level, and ascertained to be $+ \frac{1}{2}^\circ$ from the firer's position.

The next step is to ascertain the height of the hill to see if the trajectory of the bullet fired from a rifle sighted at 1,500 yards will clear the hill which is 1,300 yards distant. Using the ordinary sketching formula mentioned above, the height of the hill ($-\frac{1,300}{2 \times 20}$) = $32\frac{1}{2}$ feet.

Next, look up the table on page 52, Training Manuals, Appendix, and ascertain how high a bullet fired from a rifle sighted at 1,500 yards is at 1,300 yards, and from the table it will be seen to be 48 feet above the line of sight, hence, in the present case, the hill will be easily cleared by the bullet.

It will now be necessary to adjust the sights to enable firing to be carried out when aim is being taken at the crest line of the hill. The angle of elevation to the crest line has been ascertained to be $+ \frac{1}{2}^\circ$; and the table on page 54, Training Manuals, Appendix says that the angle of elevation of a rifle sighted at 1,500 yards is $2^\circ 59' 5''$, say, for practical purposes 3° ; hence $\frac{1}{2}^\circ$ must be deducted to allow for aiming at the crest line, leaving the elevation required $2\frac{1}{2}^\circ$; this, from the same table, will be found to be obtained (nearly, by setting the sights, at 1,400 yards (*i.e.*, from the table, the angle of elevation for sights set at 1,400 yards is $2^\circ 37' 5''$, the nearest angle in the table to $2\frac{1}{2}^\circ$). Hence aiming at the crest line of the hill with sights set at 1,400 yards will drop bullets on the position occupied by the reserves.

This third example is perhaps the one which would be least used in practice, as it requires, to a certain extent, a knowledge of what is behind the obstacle to be fired over, a knowledge which as a rule would be hard to ascertain. It would also be of material assistance to know the angle of descent from the top of the obstacle to the point on which it is required to drop bullets; this is especially the case when the objective is close up behind the obstacle to be fired over, because unless the angle of descent of the bullet is steeper than the angle of descent from the crest of the hill to the objective, it would be futile to make use of indirect fire, it being a mere waste of ammunition. Further, as a means of preventing useless waste of ammunition, it would be very beneficial to have where possible, a party who could reach such a position that from it they could watch and signal the result of the strike of the bullets. This too, it will be seen, is an advantage which could only be obtained under exceptionally favourable circumstances.

However, this third case of indirect fire would probably chiefly be used for firing into dead ground, such as hollows, *nullahs* and ravines, and it is claimed that even should this be the case, a distinct case has been made out for the use of "Indirect Rifle Fire, or that it is, at all events, worthy of serious attention with a view to its possible utility in warfare.

REFLECTIONS ON THE TRAINING OF BRITISH AND INDIAN TROOPS.

By A. L. B.

When considering the value of the army in India as a fighting machine for use against a well organized enemy, what do we find to be one of its weakest points?

Is it not its want of homogeneity?

It is divided, broadly, into two separate and distinct parts, the British Troops and the Indian Troops, and these latter again are further subdivided into men of different races and castes. The evil, however, has in their case been to a certain extent mitigated by men of various classes and religions being enlisted in the same regiments, and owing to the fact that they thus associate among each other freely, if not so much in the lines themselves, at any rate on parades, guards, and other occasions when their different duties bring them together.

When, on the other hand, we consider the relations between the British and Indian Troops, we find a state of affairs that can hardly be deemed satisfactory. There can be no doubt that on service, whether it is the case of British Troops reinforcing Indian in a mixed Brigade, or whether it is the case of a British Brigade reinforcing an Indian Brigade, or *vice versa*, the result is bound to be that, as the engagement progresses, the men of the British and Indian regiments will become inextricably mixed up with each other. Thus, there will arise a state of affairs where the officer of a British regiment, with perhaps little knowledge of the vernacular and less of the Indian soldier, will find himself exercising command over a body of men, the majority of whom may just as well be Indian as British. It is equally probable, on the other hand, that an Indian officer may find himself in a position where the larger proportion of the troops near him are British.

The first of these two cases is comparatively simple, for the Indian soldier will willingly follow the British Officer and carry out his orders, if he can only understand what is wanted of him.

The second case is much more serious and presents considerable difficulties.

It is of course inadvisable to lay down any orders as to the command to be exercised by Indian officers when they find themselves in a position of this sort, nor indeed does it seem in any way necessary: in practice there is little reason to doubt that in the heat of action, and it is of course chiefly during action that such a case would arise, the men would always follow any natural leader irrespective of the fact whether he was an Indian officer or an British sergeant, and the probabilities are that the best man would take the lead, whatever his nationality; but to ensure this, and to provide as far as possible against any hitch occurring at a critical moment, the men of British and Indian regiments should be encouraged to work more together.

With this end in view, it would appear advisable that British and Indian regiments should be mixed more together during the annual Brigade and Divisional Training, so as to accustom them to what is certain to happen in a big battle, and that every opportunity should be taken and made for reinforcing Indian Troops with British, and *vice versa*, and so that this practice may be as advantageous as possible it would be advisable that the British officers of both regiments should keep themselves more or less in the background. Thus only can a spirit of 'camaraderie' be fostered, and, once the men are accustomed to thus working together, tact and the self-assurance of the natural leaders will soon overcome the difficulties referred to above, without the necessity of laying down any hard and fast rules. It has been decided that it is unwise for the rank and file of the two races to play together, and tugs of war, hockey, cricket, etc., have been thought to constitute a danger to mutual good feeling. Perhaps it may be thought that working together may have less deleterious effects.

With regard to the first of the two cases cited above, the cure would seem to be much simpler.

There would appear to be no reason why officers of the British Army serving in India, and drawing their pay from the Indian Government, should not, within a prescribed period after their arrival in the country, have to pass a colloquial test in Urdu. It is not for an instant suggested that they should have to pass the Lower Standard, or be examined in the art of translating the English Classics into more or less indifferent Hindustani, but it would be quite possible for them to acquire a working colloquial knowledge of the "Lingua Franca" of the country, nor would it be unjust to expect it of them. Any officers not passing the required test could be exchanged with others from the home battalion.

Being thus in a position to be understood by and to understand the ordinary Indian soldier, officers of British units might be sent to serve for the period of a year with Indian units of their own Army. One day they may find themselves in command of a Brigade or a Division in India, and the knowledge of the manners and customs of the men, and of the interior economy and general working of an Indian regiment which they will have learnt during that year, will then prove invaluable both to the officers themselves and to the Indian units they command. Apart from this, however, they will probably have more responsibility thrown on their shoulders during their year with a Indian regiment than they are likely to have for some time in their British regiments, while the good feeling that even now exists to so great an extent between the officers of British and Indian units will be still further increased. An officer, moreover, who has had his outlook on life enlarged by service of this sort is not likely to make any worse an officer on return to his own corps.

Thus, when the time comes that he finds himself in the firing line with a crowd of men round him gathered from both British and Indian regiments, he will be in no strange position, and will be able to make the best of the materials at hand.

THE USE OF THE BAYONET IN MODERN WARFARE.

By G. A. T.

The necessity for efficiency in the use of the bayonet has hardly yet been thoroughly recognised in the British army. This, perhaps, to a certain extent, is due to the South African War, the latest important campaign in which we have been engaged. The fact that the Boers, though possessing the latest patterns of modern rifle and gun, were not armed with the bayonet, no doubt caused us to minimise the importance of this weapon, and even to ignore its value. The Boers recognised that without the bayonet they could not withstand an assault and arranged their tactics accordingly. In very few instances did they await the final rush, but evacuated their positions before allowing our troops to close with them. Had they waited, the result no doubt, in very many actions, would have been very different. Armed with the bayonet, although perhaps not very efficient in its use, our soldiers, once the position was reached, must inevitably have caused great slaughter among men armed only with the rifle, and consequently unable to carry on a hand-to-hand conflict. For this reason the Boers wisely evacuated their positions before coming to close quarters, and instances of hand-to-hand fighting during the war were rare. As a natural result, the impression gradually arose that hand-to-hand fighting was a thing of the past. It was overlooked that we were at war with a people, skilled in guerilla warfare and unarmed with the bayonet and, in addition, accustomed to handling a rifle from early childhood, and consequently skilled and thoroughly trained in its use. The use of smokeless powder and the nature of the country again, were additional aids to men who were by nature marksmen, and our troops, forced to attack across open plains an invisible enemy posted among rugged kopjes, frequently suffered such severe losses, before arriving at close quarters, that they were checked and were unable to advance, and on the occasions that they arrived sufficiently near to assault, it was only to find that the Boers had utilised their great mobility and retired to positions beyond. The result of all this was that, owing to the cunning tactics of our enemies, false impressions regarding the possibilities of hand-to-hand fighting in modern warfare began to arise, and the use of the bayonet as an absolute necessity for the final stage of an attack on an enemy also armed with the bayonet, after the establishment of superiority of fire, began to be ignored. The consequence was that training in the use of the bayonet in the British Army was considered by some, as superfluous and unnecessary.

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The Russo-Japanese War, as regards hand-to-hand fighting, came as a surprise to many. Far from considering efficiency in the use of the bayonet as unnecessary, the Japanese had recognised, that to cause an enemy to evacuate a position, the establishment of superiority of fire was only a means to an end; before the commencement of the war, and even during the war, whenever time was available, their troops were engaged in perfecting themselves in the use of the bayonet and accustoming themselves to charging an enemy (represented by dummy figures), entrenched or posted behind walls, etc. They recognised that the side most proficient in the handling of the bayonet, must inevitably be able to carry a position, or repel an assault. The result was obvious; whenever it came to a question of hand-to-hand fighting, the Japanese, though considerably smaller in stature than their opponents, invariably defeated the latter, and, according to the reports of British Officers attached to the respective combatant sides, and claimed also by the Japanese to be the case, this was due to a great extent to their superiority in the handling of the bayonet. One of the lessons, therefore, to be learnt from the Russo-Japanese War, is, that the days of hand-to-hand fighting are by no means past, and that efficiency in the use of the bayonet is a great factor to success in the attack or defence of a position.

Marksmanship, up to the stage of establishing superiority of fire in the attack, is most essential, and therefore must be thoroughly practised, but to quote from the recently issued "Field Service Regulations," "Troops under cover, unless enfiladed, can seldom be forced to retire by fire alone; a decision by fire *even if possible* takes long to obtain. To drive an enemy from the field, assault or the immediate threat of it, is almost always necessary". (Field Service Regulations, Part I, Chapter 1, para. 6 (2), Infantry).

It may, therefore, be assumed that efficiency in bayonet fighting is second only to efficiency in shooting, and further, that the efficient use of the bayonet must be considered as a necessary sequel to success after the establishment of superiority of fire.

It has been shown that in the Russo-Japanese war, in nearly every instance when it came to a matter of hand-to-hand fighting, the side most efficient in the handling of the bayonet, had a great superiority over the side less efficient in the use of this weapon, but without specializing, assuming that two opposing armies are fatigued by long and continuous fighting, and that both have suffered severe losses from fire, when the actual assault takes place, confidence in their ability to use their bayonets efficiently, will instil in men the desire to close with their opponents, which we are told is the desire with which Infantry should be animated (Field Service Regulations, Operations, Chapter 1, para. 6 (2)), and, therefore, if confident in their superiority in the use of the bayonet over their adversaries, the men, if assaulting, will rush forward instinctively to the

attack and deliver their assault with great vigour, or, if defending, will await the onrush with coolness and determination, or will themselves assume the offensive, and the side best trained in the handling of the bayonet will win.

Since, therefore, as stated in Field Service Regulations, Part 1, Chapter VII, para. 106 (2) that "the climax of the infantry attack is the assault, which is made possible by infantry fire," the above remarks should prove to all the necessity for efficiency in the use of the bayonet as a means of ensuring success after the establishment of superiority of fire.

In 1908, after the Russo-Japanese War, "Instructions in Bayonet Fighting" was issued to the British Army thus showing that it was considered necessary for men to be trained in the use of the bayonet. In this pamphlet the theory, as well as the individual instruction, is well and fully explained, but very little space is allotted to the practical use of the bayonet, and consequently, in many cases, this branch of the training has been entirely lost sight of or neglected. The aim and object of all instruction in bayonet fighting, is to render a man proficient in the use of the bayonet in action, and, as few instances of separate individual combats occur on service, it will be seen that the "Practical use of the bayonet" as explained at the end of the pamphlet, is a very important part of the book. The individual instruction is most necessary, as a preliminary to the practical instruction later on; it tends to make a man smart on his feet, quick to take advantage of any opening made by his opponent, certain of parrying an attack gives him confidence, and last but not least, he learns to make sure of hitting his target.

From the above, therefore, it is apparent that great attention should be paid to individual instruction, and the position of "on guard", the parries, points and chief attacks should be thoroughly learnt. At the commencement of the instruction, lectures may be given with advantage, explaining to the men the importance of their becoming proficient bayonet fighters, as even still there is a tendency to under-estimate the importance of efficiency in this branch of an infantry soldier's training. I would impress on all, the necessity of frequently practising wall pad lessons (even for experts it is most essential). This, however, is laid down and explained in "Instructions in Bayonet Fighting" and I have only recalled some of the principal points, to illustrate the necessity of careful individual instruction. One point further may be mentioned, and that is, that the Japanese do not favour the "throw point"; they say it is not practical in action, and as they have had much experience, it is as well to note this fact, as there is, no doubt, a great amount of truth in the statement, as it renders the user of the point liable to disarmament, and is fatal if unsuccessful.

Having become proficient in the points, parries, attacks, etc., the soldier must now be taught the practical use of the bayonet in the

Some suggestions as to training in bayonet fighting.

field, *i.e.*, in the attack or assault and on the defensive. For this purpose it is suggested that two opponents should be placed about 40 yards apart, opposite to one another, one on the defensive and the other instructed to attack. Both *must* be equipped with helmets, gloves, sporrans and jackets. On the word "charge" or "assault" the attacker rushes forward and delivers an attack with the greatest vigour and determination, employing one of the attacks he has learnt, in doing so; having delivered his attack he passes on. The man on the defensive parries the attack, and if successful immediately "returns." The man on the defensive then becomes the attacker and *vice versa*. After the men have become proficient in this, a further advance may be made in the instruction by placing the defender in a trench or behind a wall, thus making the training as near as possible to actual war conditions.

A point to be urged in favour of this system of training is, that all the available weapons can be used simultaneously (several men being posted opposite to one another at intervals) the attack occupies a few seconds only, and consequently much time is saved. Moreover, a whole regiment or battalion can be trained to become fairly proficient after a certain amount of individual training, as it is not an absolute necessity to train men to a very high standard of individual fighting to enable them to charge or meet an assault, and consequently some of the more intricate and complicated individual lessons may be dispensed with in the earlier instruction.

This does not mean that it is not necessary to train the men carefully in the points, parries and chief attacks, but merely that as time is also required for other branches of the soldiers' training as well as bayonet fighting, in order to save time, it is better to train them in what they will require actually in the field, than to waste their time in teaching them complicated individual lessons, which may not be of so much value to them in action. The men who show great aptitude may, however, with advantage be instructed in the more advanced lessons, but the main object is to teach the ordinary men the points, parries and certain useful attacks, which they can then use to advantage in a practical manner, and thus a fairly high universal standard is attained throughout a unit, and not a very high standard among a few. They should be taught on each occasion to decide on a certain attack and carry that attack through with resolution and determination. The men on the defensive will gradually learn to meet the various attacks with coolness and confidence, and they themselves learn to attack.

It may be urged against this suggestion that men are liable to injure themselves, but if all necessary precautions are taken, by insisting on the men being correctly equipped and, if care is taken that the men have first been properly instructed in individual fighting, very little damage is likely to result, and the obvious reply to any objection is that "as you cannot make omelettes without breaking eggs" so you cannot make proficient bayonet fighters without possibly incurring slight injuries.

The chief obstacle in the way of instructing units in the use of the bayonet, is the small allowance of equipment given for the purpose. The present supply is totally inadequate, and it is to be hoped that this will soon be recognised and a larger initial and annual issue granted. The necessity for bayonet fighting is impressed on all units, but they complain that, with the best intentions in the world, it is impossible to train a battalion or regiment of several hundred strong with the very few fencing muskets allowed; (initial issue six per unit, annual issue two): consequently, they have to buy these regimentally, which is a continual drain on funds already overtaxed, or make no further advance in the training of the men.

In the meanwhile, while hoping that an increase of weapons may be sanctioned, it is suggested that more use might be made of the service rifle and bayonet. It would seem possible to use dummy figures and teach men to charge these; the figures should be five or six yards apart, so as to minimise any possible chances of injury to the attackers. In this manner the men would grow familiar with the handling of their weapons while assaulting, and it would appear practical and feasible.

I would further suggest (in the event of an increase of an allowance of weapons not being sanctioned), that companies might buy one or two "fencing muskets" from their "games" funds. If bayonet fighting were more encouraged, the men would soon come to regard it as they do boxing, *i.e.*, as a recreation, and many men would take it up and practise among themselves, and consequently the cost of the muskets would come as a fair charge on the Company Recreation Funds. Many officers have now taken up bayonet fighting, as can be seen from the entries at the various Assaults-at-Arms, and if gradually introduced as a recreation, bayonet fighting would probably become, in a short time, as popular among the rank and file as boxing now is. As an inducement to men to take up bayonet fighting, the prizes offered now at Assaults-at-Arms might with advantage be considerably increased, especially for team combats, and more team combats might be introduced, such as for instance, teams of young soldiers only, or Non-commissioned Officers. I would offer another suggestion, *i.e.*, that, to assist units, weapons might be bought out of surplus funds of Assaults-at-Arms, as at present it is a great tax on units to provide their own weapons, many of which get broken, whereas if provided by the Committees of Assaults-at-Arms, it would be a great inducement to teams and individuals to enter, and I feel sure would be greatly appreciated, especially by units of the Indian Army. Units at present subscribe largely to Assaults-at-Arms, and might reasonably expect to be provided with bayonet fighting equipment, which would obviate the necessity of providing themselves annually with the new gear, which they can ill afford, and which would not be a very great strain on the Tournament Funds, as the broken or damaged rifles could be replaced by the surplus fund of the current year of the Tournament, without a very sensible diminution of the funds, whereas the cost of

replacement of broken equipment might fall very heavily on one particular unit, and consequently discourage bayonet fighting entirely in that unit.

If these suggestions were to be brought forward at Committee Meetings of the various Assaults-at-Arms, I think it would be found to be an incentive to the attainment of a higher standard in bayonet fighting, and, consequently, would tend to render our Infantry even still more efficient and more bold and confident, which may prove to be of inestimable value in a future war against an enemy armed with, and efficient in the use of, the bayonet.

ARE NIGHT OPERATIONS SUITABLE FOR OPERATIONS AGAINST INDIAN NORTH-WEST FRONTIER TRIBES ?

A lecture given at the Staff College, Quetta, on June 2nd, 1909.

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Introduction.

There is a common belief, prevalent in the army in INDIA, that night work on the Frontier is under all circumstances to be avoided. Is such a belief justified? That the subject is a difficult one, is demonstrated by its avoidance by most writers on frontier warfare. (Colonel CALLWELL in his "Small Wars" touches on the subject.) Their diffidence is easy to understand; and it is necessary to approach the question in a spirit of enquiry, and to endeavour to base our conclusions on an impartial consideration of the teaching of history. We hold no brief for night operations: their danger is well known. But on the Frontier, as elsewhere, the object of war should be attained by inflicting loss on the enemy. If night operations lead to this result, then such operations are justified. The destruction of the enemy has, as a rule, been imaginary, rather than real, in trans-frontier expeditions.

The following headings have been adopted in dealing with the subject:—I. A brief reference to the official text-books on night operations. II. A glance at a few examples of such operations, which have taken place on the Frontier. III. A discussion on reflections arising from a study of the question. IV. A brief summary of our deductions, and a final decision.

I.—THE OFFICIAL TEXT-BOOKS.

The peculiarities of frontier warfare need not be enumerated, and the difficulty of night work in a mountainous country against a well armed, brave and active enemy is patent to all.

With the principles of night operations we are familiar, but do our military bibles throw any light to guide us in their application to the peculiar conditions common to the North-West Frontier of India?

Field Service Regulations, Part 1, Chapter 9, deals with night operations in civilized war. In Section **F. S. Regulations, Part 1.** 129 they are classified under three main headings—night marches, night advances, and night attacks. Two points are to be specially noted—Section 135 states: "Assaults delivered during darkness may be undertaken * * * to surprise an ill-trained, ill-disciplined, or semi-civilized enemy." It is curious that research in the annals of trans-frontier war discloses the fact, that an assault by our troops in the dark has never been attempted. In

Section 140 a note of caution is sounded :—"A decisive counter-attack should rarely be attempted outside the limits of the position, since its direction must depend on the enemy's movements, and it cannot therefore be prearranged in daylight." It is well to remember this necessity for a clearly defined objective when considering night operations on the Frontier. Section 146, para. 4, deals with retirements in mountain warfare, and recommends that benighted rearguards should halt. Section 147 legislates for protection, and reconnaissance or movement between piquets at night is not advocated.

We glean little light and leading from "Frontier Warfare, 1906."

Frontier Warfare, 1906.

Night defence is dealt with, and in para. 82 surprise parties for snipers are mentioned. An inkling of possible larger operations is given in para. 2 (4). One of the duties of scouts is "in night operations to precede the advance."

A small volume of "NOTES ON STAFF DUTIES IN HILL WARFARE IN INDIA" issued by the General Staff does not altogether ignore the subject of offensive night operations. On page 42 we find :—"A night attack over ground which generally presents unlimited facilities for ambuscade, and with which the enemy are intimately acquainted, while we can have but a general idea of its features, would be extremely hazardous and has never been attempted. Night marches, for the purpose of getting within striking distance at daybreak, have, however, been successfully executed on several occasions."

Such are the chief points selected from the official books, and our first impression is that at night on the Frontier, defence, not offence, is advocated. Yet offence is not prohibited. No vain attempt at formulating rules is made. The principles which govern night operations are always the same, their application is the duty of the commander in the field, and he must be guided by his knowledge of history. We in our enquiries must also turn to history.

II.—HISTORICAL EXAMPLES.

A table of examples of Frontier night operations has been compiled.—(*Vide pp. 148-9*). It in no sense exhausts the instances of the employment of troops by night on the Frontier. All operations which simply entailed a march to surprise a village, situated in the plains, have been omitted. The feasibility of such action is not open to question. Incidents from the TIRAH campaign have not been tabulated; they are fresh in our memories and will be referred to later. Operations, such as the attacks on ALI MUSJID and the PEIWAR KOTAL, where formed bodies of AFGHAN troops were engaged, are omitted. But the extent of the list will, it is hoped, bring home to you the fact, that, in enquiring into the subject, we are not seeking after something new, but are dealing with a point of practical soldiering.

With the object of emphasising the special nature of frontier warfare, an endeavour has been made to classify the incidents according to the official divisions of marches, advances, and attacks. The result is peculiar. There are sixteen examples of night marches, while we find only one of a night advance, and none of night attacks. Another heading "miscellaneous" has been added: this includes seven instances of defence at night, and two of counter-attack, as well as several other minor incidents. We deduce from these figures, that up to date a policy of closing with the tribesmen at night has not found favour. The offensive spirit has rather been the property of our antagonists. Few details have been included in the list, but possibly the references may be of use. Some points at once strike one: such as, the length of marches performed, and the smallness of the forces employed. Night operations on a large scale have never been attempted on the Frontier. Time forbids a minute examination of many of the events tabulated; three only will be dealt with in some detail, so that we may grasp the nature of those operations which have been successfully undertaken by night against tribesmen.

First we will take the incident classified as a night advance. (17) * (*vide* Sketch No. I.)

The general situation was as follows:—In 1891 road-making proposals in HUNZA NAGIR led to opposition from the tribesmen. A force consisting of 1
NILT, 1891.
 Section No. 4 M. B., 2 Companies 1st 5th G. R., some 600 of the 1st and 2nd KASHMIR RIFLES, with a few detachments, (total 12 officers and 1,131 men), under the command of Col. DURAND, crossed into NAGIR territory on December 1st. NILT fort was captured on the 2nd, chiefly owing to the bravery of three officers. The position of the force was now peculiar. In front, to the east, was a ravine, with banks 600 to 1,500 feet high and lined with the enemy's sangars. On the left—South—was the HUNZA river, on the right bank of which was the fort of MAIUN. An attempt to advance on the 3rd, failed. On the 12th an attack on MAIUN ended in failure. For 17 days the force was stationary. Constant night reconnaissances were made to find a path to turn the enemy's left. On the 19th a DOGRA sepoy found a route to the enemy's upper sangars. It was decided to attack. On the evening of the 19th 100 KASHMIR troops under two British officers advanced in the dark over the exposed ground south of the fort. Undiscovered by the enemy they took post under the cliff on the left of the enemy's position. During the night the ridge on the west of the ravine was lined by other troops. At daybreak, under the covering fire of these troops, the storming party arrived within 60 yards of the upper sangars without being observed. The sangars were rushed and the whole position captured.

Here we have an example of a force in close touch with the enemy unable to advance by day. They persistently reconnoitred at

*These figures throughout refer to the table of examples.

night. Reconnaissance was followed by "a night advance to gain ground from which further progress will be made in daylight." (F. S. Regs., Part I, Section 134).

Let us now examine an expedition, conducted in 1852 by Major

Nicholson in 1852.

JOHN NICHOLSON, against the UMARZAI WAZIRS, who had been giving trouble along the BANNU border. (2) (*vide* Sketch No. II.) Secrecy was essential, so the troops were collected by arranging a series of marches as if in relief. The 4th P. I. marched from BAHADUR KHEL, and 2 Companies 1st P. I. from KOHAT, while the 6th Punjab Police Battalion marched North from DERA ISMAIL KHAN. The plan was follows:—No. 1 Column, Capt. JOHNSTON, formed of the 2nd P. I. was to march from BANNU at 10 P.M., December 20th, through the GUMATI PASS to DERABINA and GARANG, 17 miles.

No. 2 Column, Capt. WALSH, composed of 140 of the 1st Punjab Infantry and 350 of the 4th Punjab Infantry to march from LATAMAR at 9 P.M. on the 20th, *via* the BARGANATTU PASS and SAPARI to combine with No. 1 against GARANG. The troops in No. 2 had only arrived in LATAMAR on the 20th.

No. 3 Column, Lieut. YOUNGHUSBAND, 40 of the 2nd Punjab Cavalry, 50 Mounted Police, 400 of the 6th Punjab Police Battalion to march from BANNU at 11 P.M., against UMARZAI encampments near the KHASORA and SEIN PASSES.

Mounted videttes were posted early at the mouths of all passes between LATAMAR and KURAM POSTS. Foot levies picketted the heights to protect the march of No. 2 Column. No. 1 Column reached GUMATTI village (friendly) at 6 A.M. (12 miles in 8 hours). The village DERBINA was destroyed and captured. JOHNSTON then moved against GARANG, crowned the heights commanding it, and advanced to the attack. As he was doing so WALSH's Column appeared above the village. The combination had been perfectly carried out. WALSH had entered the BARGANATTU PASS at midnight, and at daybreak had reached the summit of the KAFFIR KOT range (21 miles). The village of SAPARI had been taken by surprise and subsequently junction was effected with No. 2 Column. Both columns camped at GUMATI, No. 2 having marched 28 miles over bad ground. The total casualties in action were only 2, but 23 men had fallen out in the 4th P. I. and were cut up. The 3rd Column carried out some successful operations, with a loss of 1 killed and 2 wounded. The 6th Punjab Police Battalion had marched 100 miles in 4 days and 12 hours. After arrival in BANNU they started on this expedition, covering another 30 miles. The first two Columns returned to BANNU by the KURRAM route and were not followed.

It was by enterprises such as these that NICHOLSON kept peace on the border. One marvels that Sir H. LAWRENCE writing to Lord DALHOUSIE, should only have estimated NICHOLSON's presence at BANNU as "well worth the wing of a Regiment." Our estimate of his value would be many times greater.

The next example is somewhat similar. It was a counter raid from HANGU by CHAMBERLAIN on the 1st-2nd September 1855 having for its object the destruction of the villages of NASIN, SANGAR, and KATSAH. (3) (*Vide* Sketch No. III). The ORAKZAIS had been raiding into our territory. SANGAR is on the crest of the SAMANA, NAZIN is not now in existence, and it is difficult to fix its exact position ; it was somewhere in the vicinity of the present DHAR POST. KATSAH is a village on the KHANKI.

The ground is well known to many of us, so the difficulty of the operation can be appreciated.

To NAZIN were two paths, one up the gorge from near PAT DARBAND, the other up the spur. The village tower commanded both approaches, and an attack by day would have involved heavy loss. To move from HANGU in the day time would have alarmed the ORAKZAIS, so the only course open was to carry out the whole operation in one night. It was moonlight.

The force was divided into four columns :—

1. Major COKE. 1st P. I. and 3 companies 2nd P. I. To march at 10 P.M. to attack SANGAR. It is interesting to note that this column was provided with hand grenades.

2. Captain HENDERSON. 3 companies of the 3rd P. I. To march at 9 P.M. and to take up a position to command NAZIN.

3. Levies, to follow COKE and then attack KATSAH.

4. General CHAMBERLAIN. 4 guns Peshawar M. B., 2 guns No. 3 Punjab Lt. Fd. Batty., 3 companies 2nd P. I., and 4 companies 3rd P. I., to follow No. 2 Column. The field guns of this column moved by the main road, so as to reach the foot-hills at dawn, to cover the retirement.

A camp guard was formed of the 4th P. C. and one company from each of the infantry regiments. The troops were only warned one hour before parading.

No. 1 column rushed Sangar at daybreak.

No. 2 after a fourteen mile tramp, commenced to climb the hill at 2-30 A.M. and was in position over NAZIN at 4 A.M. They marched in perfect silence, so that, though the enemy heard them they could not fix their exact position. The tribesmen fired some shots, which were not returned, and beat drums. The column rushed the village at dawn and drove the enemy over the peak West of Sangar.

No. 4 column left camp at 11 P.M. and arrived at Pat Darband at 3 A.M.

There was some delay in persuading the Malik to show the way for the guns up the hill. The guns came into action at daybreak. In the subsequent retirement, after destroying the villages, the enemy attacked heavily, but Capt. GREEN with the 2nd P. I. counter-attacked.

The whole force reached camp in the evening, having been on foot 17 hours, and marched 28 miles. The enemy lost 24 killed and wounded. We had 15 killed and wounded.

These two examples show how columns can converge on a definite objective. The well known principles which govern all such operations were observed.

Secrecy is essential if surprise is to be attained.

The discipline and stamina of the Regiments of the P. F. F. are remarkable.

In both cases the start was made from BRITISH territory under cover of our own frontier. In the table are examples of marches commenced in the enemy's country (10, 11, 12, 15). The point is not of great importance, as so-called friendlies on our side of the frontier are not always to be trusted. Equal precautions for secrecy have to be taken in both cases.

III.—A DISCUSSION ON REFLECTIONS ARISING FROM A STUDY OF NIGHT OPERATIONS ON THE FRONTIER.

In trans-frontier operations night marches are a necessity to surprise the enemy. To effect this surprise

Night marches.

every possible measure for secrecy must be adopted. In 1856, (4) CHAMBERLAIN went so far as to march his men without food, as he feared that any unusual cooking might make the tribesmen suspect his intentions. The advisability of moving without transport was recognised in 1901 in the MAHSUD BLOCKADE (16), even officer's chargers were not allowed with the invading columns. Night marches must often be undertaken to avoid heat, *e.g.* : 1) and (5).

Night marches are not unduly dangerous. With ordinary precautions troops have nothing to fear from tribesmen. History records no instance of disaster to a formed body at night. The affair on 26th November 1892, (22), is instructive when one notes the small damage inflicted by twenty times their number of tribesmen on a party of KASHMIR troops. That night marches are difficult is not denied, but success in war, or for that matter in anything else, is never easy. Night marches are tiring to the troops, and especially so over the rough ground to be met with on the Frontier, but, be their disadvantages what they may, we must be prepared to undertake them. If we are not so prepared, we resign all hope of surprising our PATHAN friends, and, for the hot months of the year, active operations become impossible.

NIGHT demonstrates the value of night reconnaissance, without it the path up the cliff would probably never have been found. It seems curious that reconnaissance at night has not more often been undertaken on the Frontier ; it is true that guides have to some extent taken its place, (3) (4) and (16) are instances of their being used.

Examples of night advances are rare, though deployment in the dark has often been carried out. "A night advance is the forward move of a force deployed."

Night advances.

F. S. Regs., Part I, sec. 162. Difficulty of terrain and lack of desire to close with the enemy, no doubt account for the scarcity of

examples. Rough ground is not impassable at night, witness the operations of the 1st JAPANESE Army in the battle of the 26th August 1904. The 23rd Brigade crossed in the dark, ground so steep as to render "an ordinary assault by day quite hopeless." (A Staff Officer's Scrap-Book, Vol. II, p. 54). Both in this instance and at NILT, ample time was available for previous reconnaissance. It is often otherwise. Time is generally the essence of the problem. The attacker, as a rule, asserts his superiority over the enemy by fire power, but circumstances may forbid the delay and loss entailed by a long fire fight, and more summary measures become desirable. In such cases a night advance should be risked. It may, or may not, aim at closing with the enemy. Reconnaissance before attempting the advance is, of course, desirable, but it is not always possible. There was no time for previous reconnaissance in the operations of the JAPANESE GUARD Division on the night of the 11th-12th October 1904. (A Staff Officer's Scrap Book, p. 222.)

The question of the fire fight will be dealt with later, the advisability or otherwise of a night advance is intimately connected with it. Such an advance having been decided on, this much is clear :— It can be carried out over difficult ground, and if it can be successful against EUROPEAN troops, the same may be expected when the enemy is untrained and undisciplined. Under the circumstances, we fail to see why, the necessity having been clearly established any commander on the Frontier should hesitate to undertake a night advance.

To turn now to a consideration of night attacks. Why have we avoided closing with our enemy? The majority of tribesmen rely on fire power to

stop our troops. By assaulting at night we minimise the effect of this fire. Counter-attack is scarcely to be feared except from a few Ghazis. The tribesman does not often occupy a position, but when he does the injurious effect of the "cult of positions" is as demoralising in his case as in that of a EUROPEAN army. At NILT passive defence permitted night reconnaissance and a preliminary night advance. On that occasion a closer advance in the dark was not attempted, nor was it necessary, the steep ground remaining to be crossed was defiladed from the enemy's sangars. In certain cases an assault by night might be successful. Such an operation up the precipitous slopes leading to DARGAI would be foolhardy, but could not trained troops holdly led have given a good account of themselves against the lower sangars on the SAMPAGHA? An advance in the dark was not risked: a bolder policy might have led to a more decisive victory? It is often forgotten that the PATHAN is not a night bird.

We have never ventured to assault at night, though sorties by beleaguered garrisons have been attempted with varying success. Some examples are given in the As a rule we have avoided direct contact in the dark. On the 24th October 1879 (12) Col. KENNEDY, 2nd P.C., having surprised a GHILZAI piquet, would not attack as the ground was "too rough." He sent on a party to

"observe" the enemy, following by road with his main body. On the 12th April 1880 (13) a force marching at night towards JANDOLA, finding the enemy holding the passage of a defile, waited for dawn to attack. Compare the caution of our troops on these two occasions with the dash of the Duffadar of the Guides, who, on the 3rd September 1863 (19), did not hesitate to charge a vastly superior body of tribesmen. He called out "Fall in" to his four men and then charged and drove back the enemy. The result justified his action. Probably the first two commanders acted correctly. On the Frontier, even more so than in most theatres of war, the man on the spot must be considered the best judge of how to act. The incidents are only quoted to show that our commanders did not wish to close with their enemy. We admire the boldness of the Duffadar. In savage warfare an enemy encountered should be attacked. "To make war means to attack." (The Nation in Arms. VON DER GOLTZ, p. 263.)

If we can close with our enemy, a decisive result may be expected. True, lack of reconnaissance may often render it necessary to wait for dawn, but to delay should not be an invariable rule. Had an immediate assault been made on SANGAR and NAZIN, greater loss might have been inflicted on the enemy. If trained troops can be assaulted at night, it cannot be impossible to carry out the same operation against tribesmen. The ground must of course be passable, but a glacis slope is by no means necessary. The GERMANS are against night attacks, except over easy country; our tactics however are no longer "made in GERMANY."

The chief difficulty on the Frontier is to find a fixed objective to attack. Once the purdah of trans-frontier territories is lifted, it is seldom that another opportunity offers of attacking the enemy in position. Given that opportunity victory should be made as decisive as possible. Night attacks can never be a normal form of war, but in certain rare cases, on the Frontier as elsewhere, the end to be attained must be the justification of the risk incurred.

Our Frontier officers and troops have been boldness personified :

Fire power.

why then have they avoided night attacks ?

We consider that the chief reason is to be found in F.S. Regs., Part I, Section 135 :—"When the conditions of the fire fight are likely to be favourable, it will probably be better to accept the inevitable casualties that must result from a struggle for fire supremacy, in preference to the undoubted hazards of a night attack." Since the introduction of the rifle, the conditions of the fire fight on the Frontier have nearly always been favourable to us. We have either had a better weapon or more ample supply of ammunition than has been available to the tribesmen. As a rule, our forces have been numerically inferior, but steep hill sides favour covering fire and other skilful application of fire tactics. We have not sacrificed our advantage of fire power to risk an assault by night, over difficult ground, against a more numerous and evasive enemy. The fatigue of such an operation often paralyzes pursuit. Our chances of inflicting loss on the enemy are greater by day than by night.

The bearing of this question of armament on frontier operations is interesting. The Frontier Force regiments, when raised, were armed with flint and percussion muskets. These were not weapons of either range or accuracy. The records of the 5th P. I. for 1852, state that the regiment, armed with percussion muskets only, made 24 per cent of hits on the target, of which the size is not mentioned, at 100 yards range. In 1853, it was a matter for congratulation that they had improved to 47 per cent of hits at the same practice. The 5th P.I. in 1854, received the two-grooved BRUNSWICK rifle (.704 bore, sighted to 300 yards) for two companies, and were completely armed with this weapon in 1857. In 1871, they received the ENFIELD rifle, and in 1874 the long SNIDER. The arms of other P. F. F. regiments were somewhat similar.

In the days when the jazail outraged the BRITISH musket, CHAMBERLAIN and NICHOLSON, to avoid inferiority in the fire fight, attempted stratagem and surprise at night. There is no recorded instance of their closing at night, but we do not find that they considered such an operation impossible. Then followed a period of superiority in the armament of our troops. Night operations, with their attendant risks, were no longer "worth the candle." The necessity for night operations having vanished, their possibility came to be largely overlooked.

In TIRAH, the rifle power of the enemy was again approaching our own, and we often moved from camp in the dark with marked success—*e.g.*, the flanking party (during the approach to the SAM-PAGH, 28th October, and the advance to and withdrawal from, DWATOI on the 22nd and 24th November. In the MAHSUD BLOCK-**ADE** it was realised that the only way to compete with activity and rifle power was to move at night. More recent expeditions have thrown no light on the subject.

It requires no gift of prophesy to foresee the day when the jazail and the SNIDER will be things of the past. Importation of modern rifles and ammunition into tribal territory proceeds apace. Our fire power will not in the future have its former marked superiority, and the struggle for supremacy in the fire fight will be a long and costly operation. Heavy losses against semi-savage tribes destroy the mobility, and imperil the safety, of a civilized army. We shall, therefore, seek for some method of avoiding those losses, and possibly it may be found in a judicious use of night advances and night attacks.

Superiority of fire power, and consequent lack of necessity for night operations, gave rise to an opinion that

The prejudice against night operations

at night on the Frontier we should be chained to the defensive. Some colour was given to

this assertion by the fate of various detachments, disorganised by retreat and hampered with wounded, benighted and left to the mercy of victorious tribesmen. Then in those so-called "disasters" when the enemy succeeded in penetrating our camp, such as the attacks by MAHSUDS at PALOSIN (18) and WANO (24), our considerable losses

blinded us to the fact that the enemy suffered more heavily than we did. It would seem to have been tacitly acknowledged that only by fire power were we superior to the tribesmen, and we avoided meeting them at night. The hand-to-hand superiority of the PATHAN still remains to be proved: the offensive power of our troops by night cannot be judged from the fighting capacity of a few disorganised and isolated detachments. Nothing has ever occurred on the Frontier to justify us in holding the opinion that an offensive night move by our troops, with a view to assault, is impossible. It is our belief that the incident on the ARHANGA on November 1st, 1897, and several other minor night affairs, justify us in holding the opinion that our troops can take the offensive with every hope of success. On the 1st November, the AFRIDIS had everything in their favour, they rushed a weakly guarded convoy, and yet reinforcing troops arriving, in the dark and on unknown ground, had no difficulty in driving them off. If a few GURKHA scouts in TIRAH were able to put so considerable a check on sniping, offensive night operations by organised columns would soon undermine the courage of the enemy.

One last reflection strikes one when studying this subject—the necessity for training. The majority of the incidents quoted were the work of that magnificent force the P. F. F., who were, and are, past masters in hill warfare. Their training and traditions render them eminently fitted for such work. But it is to be noted that in some cases BRITISH as well as INDIAN troops were employed successfully on night work, *e.g.*, 27th October 1880 (14). Surely it is not a vain boast to consider that our training has made some advance in the last thirty years. What we could do then, we could do much better now. In time it is hoped that the skill of the P. F. F. may become the common property of the whole army. Success in night work is largely a question of individuality, and to foster individuality is one of the great objects of modern army training. The Chief of the Staff, SIMLA, in his recent MEMORANDUM on training, lays special stress on the importance of night training.

IV.—SUMMARY AND CONCLUSION.

To briefly summarise:—Our text books devote little attention

Summary. to offensive night operations on the Frontier.

We have noted some historical incidents of such operations, and have examined three of them in detail. From a study of these incidents, and making deductions from our general knowledge of war, we arrive at certain conclusions:—

Conclusions. (1) Night marches are a necessity for surprise and to avoid heat.

(2) Night reconnaissances are practicable.

(3) Night advances over rough ground, when necessary, can be carried out.

(4) Night attacks are possible in civilized warfare so, consequently, can in certain circumstances, be carried out on the Frontier; but in hill, as in every form of warfare, they must be *exceptional*.

(5) In action an enemy is, as a rule, overcome by fire superiority. As the tribesmen increase their fire power, we must be prepared to use night advances to help us in attaining fire superiority.

(6) In hand-to-hand combat, trained troops have nothing to fear from tribesmen.

Such are the conclusions arrived at, and to those who have given this question their consideration, they contain nothing startling and nothing new. The correctness of the official opinion is demonstrated; special instructions for hill warfare night operations are unnecessary. The general principles in F. S. Regs. are all that are required. But there are many officers who, seeing the danger of trans-frontier night operations, are prepared at sunset to quietly resign initiative to the enemy. Possibly, a study of frontier military history may induce them to alter this opinion. Outside KABUL on the 8-9th October 1879, through neglect of keeping touch at night, we allowed the remnants of the AFGHAN army to slip through our fingers. On the Frontier, time after time we have dug ourselves in, and permitted a brave, but inferior, enemy to annoy us with their fire.

The value of offence must never be lost sight of. In our Frontier policy we have forgotten the teachings of BACON and the practice of NICHOLSON.

The offensive.

BACON in his 29th essay, treating of nations "that pretend to greatness," advises them "that they sit not too long upon a provocation." NICHOLSON acted on that advice. As a rule, more gentle methods have found favour on the Frontier, and the PATHAN has not been slow to appreciate the situation. However, our chief concern is with the conduct of military operations, and we must be careful that they are not infected by the same lack of offensive spirit. Better arms will increase the resisting power of our adversaries, and a bold offensive on our part will be more than ever necessary. They will not be slow to profit from any hesitation.

When next the Frontier is 'up', we will find mountain positions occupied by first class marksmen.

Conclusion.

Artillery and rifle fire may fail to silence them, and a BRITISH force may again, as at NILT, find its progress arrested, but the opposition will be infinitely greater. What then is to be the result? Are we to waste our strength in impotent rushes by day? Such efforts will be futile. When darkness comes, are we to withdraw our weary troops, and leave the victorious enemy to his dreams and the repair of his sangars? Rather must we, secure in our moral and professional superiority, take advantage of darkness, and overcoming all difficulties, press forward to destroy our enemy. No wild, unthinking, application of night work is advocated. War by day on the Frontier must always be the

We must be prepared to undertake night work.

normal form, but in certain circumstances night operations become necessary, and we must be prepared to undertake them. When carrying them out we can remember that, at night, an organised force of disciplined troops has nothing to fear from the bravest of irregular mountaineers.

TABLE OF SOME INSTANCES OF NIGHT OPERATIONS ON THE NORTH-WEST FRONTIER OF INDIA.

No.	Date.	Night marches.
1	1840 August.	Operations against the MARRIS. 1st and 2nd Bombay Grenadiers. Poona and Sind Horse. Marches at night to relieve fort KAHAN in hills E. of SIBI. Stormed NAFFUSAK Pass, found no water, and had to retreat to SARTAF. Lost all transport and had many casualties during retirement in dark, they had no water for 36 hours.
2	1852 20-21 December.	JOHN NICHOLSON against UMANZAI WAZIRS. Three columns, one 12 miles by night in nullah. Successful.
3	1855 1-2 September.	CHAMBERLAIN from HANGU against NASIN and SANGAR on SAMANA. Complete success.
4	1856 6-7 December.	CHAMBERLAIN from THAL against MIAMIS WAZIRS. Two columns. One had to pass through a gorge only wide enough for one man. Guide led part of one column wrong. Remainder pushed on. Successful. Careful measures for secrecy.
5	1857 20th July.	VAUGHAN 14 miles against HINDUSTANI fanatics in NABINJI, BUNER. Guns, Cavalry and Infantry. A night march to avoid heat.
6	3rd August.	VAUGHAN 6 guns, 1,000 bayonets and 300 sabres against NABINJI. A successful turning movement at night.
7	1858 April.	In operations against the KHUDU KHELS of CHINGLAI. Several columns crossed the frontier at night, one of 6 guns, 330 sabres, 1,760 bayonets.
8	1878 14-15 February.	WIGRAM BATTYE against UTMAN KHELS, 280 all ranks mounted from MARDAN, rode 32 miles, then 7 miles on foot. Surrounded SAPRI and rushed it at dawn.
9	13-14 March.	HAZARA Mountain Battery, 240 Guides Cavalry, 428 Infantry. Marched from MARDAN 8-45 P.M., surrounded RANIZAI village of SHAKOT, and returned the same day to MARDAN. 50 miles in 24 hours.
10	19-20 December.	A column of British troops and Gurkhas from ALI MUJID attempted <i>via</i> the CHORA KANDAO, to surprise the ZAKHAS. Failed.
11	1879 31st March.	Mixed force under Genl. MACPHERSON from JALALABAD against KHUGIANS. 10th Hussars missed ford over KABUL river, 1 officer and 46 men drowned. The operations failed.
12	24th October.	A mixed force under Col. KENNEDY 2 P. C. after march of 10 miles surprised a GHILZAI piquet, but did not attack as "the ground was too rough."
13	1880 12th April.	A mixed force (700) to operate against the BATANIS of JANDULA. Concentrated during night at KOT KHIRGI. Advanced at 3 A.M., and after 4 miles halted as enemy were in occupation of the defile.

14	27th October.	Brig-Gen. GORDON 2 guns 250 18th B. C., 250 K. O. L. I. 250, 20th P. I. from THAL 9-30 P.M. against MALIK SHAH section of WAZIRS. Avoided all villages. Complete surprise. Back in THAL 6 P.M. 28th. 32 miles in all.
15	1883 25-26 November.	During Survey Expedition to TAKHT-I-SULIMAN Col. RICE executed a turning movement and got in rear of the enemy in the dark.
16	1901 24th November.	MAHSUD BLOCKADE. Three columns, without transport, entered the country from various points. Successful.
NIGHT ADVANCE.		
17	1891 19-20 December.	HUNZA NAGAR Expedition. Advance from NILT to attack enemy's sangers.
MISCELLANEOUS NIGHT OPERATIONS		
18	1860 23rd April.	MAHSUDS rushed Col. LUMSDEN's Camp at PALOSIN, British loss—63 killed, 166 wounded. Enemy 132 dead found.
19	1863 3rd September.	AMBELA campaign. Hindustani fanatics marching to attack camp at TERT. A patrol of 1 Duffadar and 4 Sowars of the Guides met and charged their advanced party, driving them back on their main body, which dispersed.
20	1891 March.	BLACK MOUNTAIN. Tribesmen rushed our piquet in GHAZI-KOT. Village cleared at daybreak. Loss 4 killed and 25 wounded. Enemy left 25 bodies.
21	December.	HUNZA NAGIR. Constant night reconnaissances from NILT.
22	1892 26th November.	100 Kashmir levies attacked on march by 2,000 SHINAKI tribesmen near THALPIN. The enemy beaten off with 50 killed. Only 7 Sepoys wounded.
23	1893 4-5 March.	During attack on CHILAS FORT an attempt at counter attack from the fort by KASHMIR troops failed.
24	1894 November.	MAHSUD attack on WANO camp. We had 45 killed and 75 wounded. 125 bodies of the enemy were found in camp.
25	1895 3rd March.	During retirement to CHITRAL fort. Captain BAIRD's party isolated and nearly all wounded.
26	6-11 March.	Night attacks beaten off by EDWARDS and FOWLER.
27	March, April.	During siege of CHITRAL in no case were the enemy's night operations entirely successful.
28	1897 26th to 31st July.	Col. McRAE with a few men of the 45th Sikhs kept the enemy at bay on the BUDDHIST road for 4 hours on 26th during the attack on the MALAKAND. After the first two nights of the attack the enemy was nowhere successful.
29	16th September.	Under cover of darkness the MAHMUNDS took advantage of the disorganization of Gen. JEFFERY's force. We had 38 killed and 113 wounded.

PRIZE ESSAY, 3RD LAHORE DIVISION.

BY CAPTAIN H. D. SHAW, 1ST GURKHA RIFLES.

The Lessons in Modern Tactics to be derived from a study of the Russo-Japanese War.

The Russo-Japanese War came at a most opportune time as regards the British Army whose tactics had shortly before been almost entirely remodelled by the South African War. It was a grave question whether this had not been overdone and there were many who considered that we had gone a great deal too far in our changes, maintaining that a war between two armies, modernly equipped and organised, would be a very different matter, requiring very different tactics, from the Boer War.

In the Russo-Japanese War we had exactly what was wanted to prove or disprove these theories—two armies whose rank and file were of equal morale and the issue of whose encounters would therefore depend entirely on the handling, both strategic and tactical, and previous training of the opposing forces. As the war progressed it became more and more obvious that the advantage of leading and training lay all on one side. That a nation like the Russians, whose rank and file were of the best, could go through a whole campaign without a single success of any magnitude, brought home to every one the stupendous importance of training and leading. We now look back on a war waged under almost every conceivable variation of conditions—in intense heat and bitter cold—over plains as flat as those of India and over mountains which compare with our own frontier ranges—through luxuriant crops and desert tracts—an almost ideal school, in fact, from which to learn the lessons of war; and it only remains to the onlookers to learn the lessons taught, and train their armies to the altered circumstances of modern warfare; for one fact stands clear to all who watched, that no matter how adaptable the troops of a nation may be, that nation will stand but little chance of success which enters the lists of modern warfare without the most up-to-date weapons, the most up-to-date training in the best use of those weapons, and the skilled leading now required of all in authority in modern armies, from the group commander to the C-in-C.

In dealing with the tactical lessons of the war it will be most convenient to take each of the three arms in turn, and after discussing the lessons which affect them to finish by dealing with the tactical questions involving all arms generally.

ARTILLERY.

Though the tactical importance of artillery may be said to have been fully upheld by the Manchurian war, more cannot be said. The

tremendous destructive powers of modern artillery were to a large extent neutralised by the fact that, after the first few occasions, troops of necessity adapted themselves to the new conditions; it being obvious to all that exposure of troops in any form of dense formation within range and sight of hostile artillery meant certain disaster.

Equally did this apply to the artillery itself of both sides, and invisibility of the guns became of paramount importance; so much so that after the middle of June 1904 practically nothing but indirect fire was used by the artillery of both sides. The state of affairs soon resolved itself into the following:—Infantry could not hope to advance by day against hostile artillery, but the latter could do little by night which therefore became the time when all advances took place, troops being entrenched and concealed by daylight.

The chief tactical lesson of the war as regards artillery was, therefore, the necessity of concealment and the supersession of direct fire by indirect fire.

To cite a few examples of the importance of concealment—at the battle of the Yalu, April 30th, 1904. The Russians had made no attempt to conceal their guns, whereas the Japanese had made use of every device imaginable. It is true that in this battle the Japanese had a large preponderance of artillery both in numbers and weight, but that alone was not responsible for the fact that the Russian artillery was completely silenced in 30 minutes, a carefully concealed and cleverly worked artillery would have been of almost incalculable use to the Russians that day; as matters went, by its prompt destruction it merely served to improve the morale of the whole Japanese army at a critical moment.

Again the great effect of a single Japanese battery at the battle of Telissu (June 14th, 1904), which opened fire at about 1-30 P.M., and which could not be located by the Russians, is a striking instance of the advantage given by concealment. Though up to this moment the Russian artillery had dominated that of the Japanese and rendered any advance of the infantry impossible, the action of this invisible battery at once changed the whole aspect of the fighting. The Russian batteries were silenced and the Japanese infantry launched to the attack.

But by far the most striking instance of the enormous powers of a concealed artillery was the action of the two small mountain guns at the battle of August 26th, 1904. Although, in this case there was no hostile artillery to be reckoned with, the position in the corps from which these two guns turned the fortunes of the day was well within rifle range of the enemy's trenches, and had they given the Russians an inkling of their position, they must have retired immediately or ceased firing.

We next come to the vexed question of concentration *versus* dispersion. On the whole the war may be said to have answered in favour of concentration, but always subject to the absolute necessity of concealment. This necessity of concealment has made it almost

impossible for guns to take up or change positions during the progress of an action. Guns must therefore be placed, under cover of darkness, in such positions from which they will best be able to assist the infantry attack ; and there they will probably have to remain at any rate until next night. The old practice of keeping a part of the artillery with the Reserves may be said to be dead, chiefly owing to the above-mentioned difficulty of bringing up guns into action during the progress of a battle. All this tends to concentration. The Japanese, working with an inferior weapon and, generally speaking against superior numbers, obtained satisfactory results by concentrating their artillery in large batteries.

The chief exception to the above is the working of a palpably weaker artillery in face of an overpowering hostile artillery. Here the necessity of concealment becomes so vital as to compel dispersion even as far as to single guns. The Boers taught us this lesson in South Africa. To take two instances from Manchuria :—The Russians had two splendid opportunities to display the clever working of an inferior artillery at the Yalu and Nanshan (May 25th, 1904). In both cases, owing to the injudicious placing of their guns, these were silenced almost at once and were able to take no further part in the battles.

The next lesson we get is the necessity of heavy guns with an army. Not only must the field artillery be of the latest and heaviest pattern conformable with portability, but every army must also be accompanied by heavy guns and mortars.

Again and again throughout the war was the necessity of heavier metal felt. At the Yalu the mortars of the Japanese put all doubt as to the issue of the artillery duel out of the question. At Liao-yang, as in the fighting round Mukden, the heavier guns of the Russians almost always completely dominated the Japanese artillery. Both sides felt the importance of having the heavier guns and made the greatest efforts in this direction. Six inch guns were, whenever possible, brought up to the battlefield by rail—noticeably by General Oku in front of Liao-yang in the fighting of September 1st to 4th ; and by the Russians in the defence of Mukden at the end of February 1905.

Another point brought out by the war is the value of howitzers. Their suitability to indirect fire, their power to search reserve slopes and their destructive capabilities against villages and field works render them of enormous use. Indeed the war may be said to have proved them indispensable to cavalry. The failure of the Russian, General Mistchenko's, cavalry raid (January 8th—15th, 1905) was almost entirely due to the absence of howitzers with the force.

As the war proceeded, and the night attack or night advance became more and more resorted to owing to the deadly nature of artillery fire by day, the want of powerful search-lights attached to batteries became more and more apparent. This subject wants careful attention on the part of the authorities as these engines are certain to play an important part in the next war.

Finally we come to the question of ammunition supply. Owing to the concentration and accuracy of the enemy's fire, teams had to be placed under cover further and further from the guns. This naturally enormously increased the difficulties of supply. In almost all the big battles of the war the artillery of both sides had to slacken or even at times cease fire owing to the necessity of husbanding ammunition. With modern quick-firing guns the expenditure in a prolonged battle proved to be far beyond even what was anticipated.

This subject also wants the most careful attention both as regards the accumulation at the front of the immense quantities of ammunition now required, and also as regards the moving it up to the guns from the teams, which may now be a distance of half a mile or even more. Some better means than moving it up by hand, which was the only way found possible in Manchuria, should, if possible, be evolved.

CAVALRY.

The lessons of the war in the tactical use of cavalry are particularly interesting and very pronounced.

The Russian Cavalry went into the war with a world-wide reputation, and was known to be better horsed and more numerous at the seat of war than the Japanese Cavalry. The word Cossack was proverbial in Europe and stood for all that was good in light cavalry work. The Japanese Cavalry was known to be poorly horsed, and its horsemanship also was generally supposed to be poor. No one doubted the crushing superiority of the Russians in this arm. And what happened? The Japanese Cavalry may be said to have accomplished much during the war; the Russian Cavalry nothing beyond actual protection.

The explanation for the complete reversal of all forecasts lies in the tactical handling of the respective cavalries. The Japanese employed their cavalry on the only possible principles on which cavalry can be used in modern warfare, that is, as a mobile infantry; and its use might have been greatly extended had it been armed with the cavalry weapon of the future, the infantry rifle. In the whole campaign there is only one instance of cavalry charging according to the old cavalry style (the small affair of May 30th, 1904, south of Telissu), whereas it is no exaggeration to say that hardly a day passed in which cavalry had not to fight dismounted as infantry.

Therein lies the explanation. Cavalry has no longer a place in its old rôle on the modern battlefield, or in front of the modern army. The Japanese recognised this, and when they employed their cavalry for reconnaissance or protection in front of their armies, they used it as a mobile force, generally in conjunction with infantry and always prepared to dismount and act as infantry; and again on the battlefield they used it as a mobile force, available to move long distances to a threatened or critical point, but always prepared on arrival at that time to leave its horses and act as infantry.

There is a third important function of cavalry; that of raids, generally on communications, which we shall deal with more fully

later on, but here again the fundamental lesson is the same; cavalry on the raid must these days consider itself as a mobile force, prepared to fight as infantry, with its horses at hand ready to enable it to pursue success or carry it to safety.

Let us now take these three functions of cavalry in turn, and deal with them more in detail. First as regards reconnaissance and protection.

The attempts of the Russian Cavalry to pierce the Japanese screen continually failed owing to it always finding itself opposed to infantry or dismounted cavalry, against which it could make no headway. This was due partly to the fact that the Japanese protecting screen generally consisted of mixed infantry and cavalry, but very often the supposed infantry was dismounted cavalry. This piercing of the protecting screen to obtain information is undoubtedly one of the most difficult problems of future wars. The Japanese were certainly more successful than the Russians in obtaining accurate information, but although this was partly due to the faulty tactics of the Russian Cavalry, it was much more due to their well regulated system of spies for which the circumstances of the war were particularly favourable to Japan.

The failure of General Sanzonoff's cavalry to gain any sort of accurate information as to the Japanese movements after the battle of Telissu (June 15th, 1904), although he was in actual contact for 23 days, is a notable example of this failure of the Russians to pierce the protecting screen.

As regards the best use of cavalry on the battlefield, we find many good examples. The sending of the 2nd Cavalry Brigade under Prince Kanin (Kuroki's last reserve) at the battle of the Shaho to Chaotao on the 11th October 1904 was a fine example of a rapid move of the reserves of an army to a threatened point, a move which owing to the distance would not have been possible with a reserve composed of infantry; Prince Kanin's dashing piece of work at Penchiho the next day was a fitting sequel and an example of the powers of cavalry accompanied by machine guns when properly used.

The prompt taking of the opportunity of a gap opening between the armies of General Kaulbars and General Bilderling on March 9th, 1905, during the battle of Mukden by the Japanese is another good instance of the best use of cavalry. This decisive stroke would have been impossible with slow moving infantry. As it was, the cavalry, pushing through the gap with their artillery, converted an ordinary retreat into a disaster for the Russians.

Such are the opportunities which will render the rôle of cavalry, properly used and properly armed, of immense importance on the battle-fields of the future.

In "Modern Strategy" by Colonel James we find the following paragraph:—"The vital necessity to the complex modern army of its communications renders it more than ever sensitive to any attempt to interrupt them." This operation of threatening communications

is commonly known as a "raid," and brings us to the third important rôle of mounted troops in modern warfare. The truth of this saying was fully borne out in the war in Manchuria and with an active cavalry on either side it was a foregone conclusion that such an attempt would be made. Here was a branch of war at which the Russian Cavalry was sure to excel; well mounted and with dashing leaders, their possibilities in this direction were considered infinite; and yet once more we have nothing to chronicle on their part but failures. Raids they certainly made which lacked nothing in energy, dash and daring; well planned and ably carried out to a certain point yet always doomed to failure because at the critical moment the cavalry were unable to fight infantry for lack of the necessary weapons and training.

The first Russian raid occurred early in the war and up to a certain point was fully favoured by fortune. The town of Anju in Korea, on the line of communication of the 1st Army under Kuroki had, owing to the fact that the line of communication was in the act of being changed, been left with a garrison of only 70 reservists. On May 10th Colonel Matoroff with 500 Cossacks swooped down on the town. Owing, however, to his men not being able to fight as infantry, he was unable to force an entry, and, after allowing reinforcements to enter, was eventually driven off by a total force of Japanese Infantry in numbers equal to about one-third of his command.

General Mischenko's raid from Mukden in January 1905 on the Japanese communication round their left flank is a very similar instance only on a much larger scale. General Mischenko with 5,000 cavalry and horse artillery crossed the Hunho on January 8th and moved round the Japanese left. Everything went smoothly at first: on the 11th the railway was struck near Haichong and considerable damage was done. On the 12th however 1,000 Japanese entrenched in the station of Yinku were attacked. The attack failed for want of howitzers and infantry rifles, and Mischenko had to hastily retire, having accomplished little, from a position in which a success would have had far-reaching results.

Contrast this last example with the successful action of the Japanese Cavalry under General Akiyama during the battle of Mukden. Strengthened by 1,000 infantry, and accompanied by machine guns and artillery, General Akiyama with 40 squadrons left the Hunho on the 1st March and succeeded in getting round the Russian right. Continually outflanking the enemy and driving them back he reached the railway on the 9th, capturing large quantities of stores and ammunition.

With this example of the correct use of cavalry we shall leave this branch of the service, and proceed to discuss the tactical lessons of the war which deal with infantry.

INFANTRY.

Though the Russo-Japanese War was essentially an infantry war, the new lessons from a purely infantry point of view are not so

pronounced as those dealing with the other arms. This is largely due to our South African experience coming immediately before, most of the infantry lessons of that war being fully confirmed by the course of events in Manchuria. When, however, in spite of the lessons of all large campaigns since 1866, we find the Russian infantry in 1904 entering a war with such obsolete practices as volley firing, and with a marked preference for the bayonet to the bullet even at 500 yards range, it will perhaps be not altogether vain to repeat some of the lessons of former wars which are borne out by the present campaign.

While on the subject of the bullet, too much stress cannot be laid on the necessity of marksmanship. All reports from the seat of war agree on this subject.

The marksmanship of the Russian infantry was worse than poor. Hence not only the remarkable difference in the casualty returns of the two combatants throughout the war, but herein also lies the explanation of how it was possible for these Russians to be again and again turned out of prepared positions. It has been said over and over again that if the Russian shooting had been even moderately good (at Mukden after a year's fighting) the Japanese attacks over the open would have resulted in a disaster.

The Japanese marksmanship was by no means perfect (according to some, not even good at times), but compared to that of the Russians it showed up most favourably, and went a long way towards the building up of the long list of Japanese successes.

We rightly pride ourselves on the marksmanship of our standing army, especially in India; and with our large annual expenditure of ammunition, our great opportunities for firing off the range, and the general keenness of officers in this branch of training, it is probably not going too far to say that we are most likely a good deal in front of most armies in the respect; but such is the paramount importance of good marksmanship in a soldier nowadays, that we might even go a step further, which our voluntary system of recruiting would enable us to do, and refuse to keep men who are, at any rate, not average shots. Every company or double company commander could name three or four men at least in his command who are really poor shots, to pass whom through the necessary standards entails a large expenditure of ammunition every year. These men a Commanding Officer should be able to get rid of automatically, irrespective of their length of service, under some such clause as "unable to maintain a proper musketry efficiency," just as at present he can get rid of a man under three years' service as "unlikely to become an efficient soldier."

The question of the infantry advance to the attack was by far the most important one to which infantry officers looked for an answer in the war. Had we overdone things since the Boer War? and would our loose extensions lack the driving force necessary to the successful attack, which was the opinion of the continental nations? The answer is very clear. The Japanese entered the war with the

German formations. Immediately after the first battle (Yalu) Sir Ian Hamilton finds them practising very much looser formations. A month later (June 15th) we find the Divisional Commanders empowered to double the drill book intervals. At the battle of Chaotao (July 18th), the German formations are being discarded and our own South African formations being adopted. At the Yoshirei Pass (July 31st), the formation of the firing line, as described by Sir Ian Hamilton, was very loose, and from thence onward we find loose formations everywhere adopted by the Japanese.

The Russians, on the other hand, favoured close formation, and paid the full penalty throughout the war. The same authority quoted above, in describing the battle of the Motienling Pass, states that "the closeness of the Russian formations left nothing to be desired from the Japanese point of view"; and these dense formations were responsible for the disproportionably large Russian losses as compared to those of the Japanese, in this as in nearly all the other battles of the war.

To take one more instance, we find at the battle of the Shaho the magnificent effort of the Russians to capture Penchiho on the Japanese extreme right on October 12th was completely spoilt by the unsuitability of their dense formation against the deployed line of the Japanese. The Russians advanced in battalion quarter column trusting to the bayonet, with the inevitable result of such tactics against modern rifles. Not only, therefore, do we find that the wide extensions of South Africa are absolutely necessary in the advance under fire, but we find the Japanese in the later stages of the war going even further and sacrificing the even lines of the start of the attack to the necessity of wide extensions and use of cover; the various groups rushing pell mell at full speed and for marvellously long stretches after their leaders in irregular swarms to the next halting place, which may be considerably out of the direct line if better cover exist on either side; group leaders being responsible for the general direction, and ultimate direct attack on the objective. This is undoubtedly the best way of getting over open ground, but requires careful training in peace time.

Another point accentuated by this war is the importance of the entrenching tool in the attack. The Japanese may be said to have reduced the use of the spade in the attack to a fine art. Ground gained in the attack was never relinquished. In some cases the firing line sank into the ground like moles, digging themselves in under fire; but generally, owing to the deadly nature of modern fire, the advance was made under cover of darkness, the firing line being entrenched in their new line by daybreak, and the supports or reserves moved up to the line of trenches vacated by the firing line. Infantry must be provided with a suitable entrenching tool and instructed in its use, not only standing, but while lying prone.

The tactical importance of fire discipline which controls the expenditure of ammunition and so helps to solve the knotty question of supply, is another lesson of the war. In fact fire discipline

combined with good marksmanship would practically solve the question and at the same time render certain the attaining of the fire mastery without which the final assault is impossible. A question which is not yet properly solved is that of firing during the night. The experiences of the war certainly show that, as far as the attacker is concerned, the less firing the better, trust being put to the bayonet; but as regards the defender, opinions seem to differ as to whether fire should be opened as soon as the attack is detected, or whether it should be reserved until the attackers are close to the trenches.

These are the most important lessons which deal with infantry alone and we now come to our last heading, under which we shall discuss those lessons affecting the tactics of an army in general.

GENERAL.

The importance of a definite plan whether it be the plan for a whole campaign or only the tactical plan of operations for a single battle has always been so obvious that we can scarcely put it down amongst the lessons of the war. In this war, as in all other wars that have ever been, we continually come upon instances of the want of definite plans—troops disheartened by marching and counter-marching—reserves out of place at the critical moment or previously frittered away in aimless fashion—without striking new ground, but on the other hand we can learn much from the Japanese in the carrying out of plans when made—first the impenetrable secrecy with which the plan is guarded, next the generous co-operation of all ranks in the carrying out, and, lastly, the unalterable determination with which it is carried out regardless of cost. In the relentless spirit of “no surrender” too, the Japanese have set a high example to the older nations.

The tactical point most emphasised by the war, however, is the overwhelming value of the offensive. It may now be laid down as an unfailing axiom that to persist in the defensive rôle is to commit tactical suicide. The Russians, for reasons of their own, chief of which, we must presume, were want of confidence in their generals, their staffs, and the shooting of their troops in the open, persistently accepted the defensive rôle, with the result that they were never within reasonable reach of any important tactical success. The powers of modern rifle fire have rendered impossible the old time counter-attack by which the defensive was turned into the offensive. The immense frontage of the modern battlefield which renders it exceedingly difficult to move reserves in time to a threatened point, confers an additional advantage to the attackers, who, having the initiative, can decide at what point along the battle-field, or behind which flank, the issue of the day will be decided.

This difficulty in getting reserves up to a critical point in time, combined with the difficulty of piercing the centre of a modern line of battle against modern arms, greatly increased the importance of turning movements, and consequently tended, as the war

proceeded, to materially alter the normal position of the reserve both in the offensive and defensive to the flanks instead of the centre. This naturally conferred an additional advantage to the attackers, who could mass their reserves towards whichever flank from which they intended the chief turning movement to be attempted; whereas the defenders had to be prepared for eventualities on either flank. Before leaving the subject of turning movements we must notice another point brought forward by the war. The containing powers of infantry nowadays are very great under any circumstance, owing to the precision, long range and rapidity of fire of modern rifles, but in hilly country these containing powers are enormously increased, and as a general rule the war has proved for this reason that the decisive stroke on an enemy's flank should not, if the choice exists, be made on a flank resting amongst mountains.

Night operations in the Russo-Japanese War may be divided into two distinct classes, the first the night march culminating in an attack during the night or at dawn, the second merely an advance by night with the intention of gaining ground swept by artillery or rifle fire under cover of darkness. In this latter case the troops started digging themselves in at or just before dawn, so that they were under cover by daylight. Owing to the accuracy of fire this soon became the usual form of advance on a position, and as this is bound to be the same in future wars this operation should be extensively practised in peace time.

An interesting point occurs in connection with night operations. As the war progresses we find the Japanese in selecting positions to resist night attacks coming round more and more to the opinion formed by us on South African experiences, that it is better to place the defenders at night a short distance back from the crest line, so as to get the attackers against the sky line, even though a more extensive field of fire is thus sacrificed.

Space forbids us to deal in this essay with the subject of the various tactical aids to both offence and defence. The placing of obstacles, the necessity of well sited and well constructed trenches, with loopholes and head cover, the use of hand grenades, light railways, visual signalling and the many devices used to give concealment, both to works and to movements of troops, are all points, the importance of which are fully brought out again and again during the war. Visual signalling was little used by either side, but the opportunities for its successful use were many: especially in the mountainous country traversed by the 1st army on the right; and a good signalling equipment must have saved General Kuroki many anxious moments, besides ensuring co-operation, not only between own divisions, but between his army and the armies on his left as they drew together in front of Liao-yang. This essay has however long passed the limits originally intended, and it is time to bring it to an end. In conclusion, therefore, we would point out that in the race of nations to prepare their armies for the new conditions of a modern campaign, the British Army starts with a

generous handicap. The lessons so painfully learnt by our army in South Africa have almost without exception been proved to apply to all circumstances of modern warfare. And these conditions of modern warfare are peculiarly favourable to our armies. The comparatively long term for which we enlist our men under the voluntary system should enable us to give our troops the high training now required. Numbers no longer count as much as efficiency. We know our men will fight in the extended order rendered necessary by the precision and rapidity of modern fire. Well led, well trained and every man a good shot, there would be little fear to our army in a conflict under modern conditions even with a nation whose forces greatly outnumber our own.

THE EMPLOYMENT OF FIELD TROOPS OF THE ROYAL ENGINEERS WITH CAVALRY.

A Lecture delivered at the Staff College, Quetta, on May 5th, 1909.

BY BREVET MAJOR J. R. E. CHARLES, D.S.O., ROYAL ENGINEERS.

The employment of mounted Engineers with Cavalry is, comparatively speaking, an innovation, and there has not been so far much written on the subject. And indeed this is not surprising, as ours has been the first army to utilise Engineers in this way, and we have the experience of only two or three campaigns to fall back upon, and none of these were fought against properly organised troops, or in an EUROPEAN terrain.

Such materials as have been available for the writing of this paper, have been obtained chiefly from the personal experiences of officers who have served with mounted Engineers on active service.

The subject will be treated under the following headings:—

1. Short history of the development of Field Troops.
2. A comparison of the Cavalry Pioneer and the Mounted Sapper.
3. Experiences of Field Troops on active service.
4. General conclusions as to the employment of Engineers with Cavalry.

HISTORY OF THE DEVELOPMENT OF FIELD TROOPS.

Early in September 1882, during the EGYPTIAN campaign against ARABI PASHA, a party consisting of one officer and about twenty rank and file, was collected from the Royal Engineer units of the Field Force, and mounted on horses and mules, and attached to the Cavalry Division under General DRURY-LOWE. This unit accompanied the Cavalry Division in the engagements of KASSASSIN and TEL-EL-KEBIR, and during the subsequent advance on CAIRO. During the latter operation, a lot of useful work was done in assisting the Artillery and wheeled transport over the irrigation cuts which abound in that country, by preparing fords and improvising bridges. Telegraph offices were also seized at ZAGAZIG AND CAIRO, and communications were opened up with the main army which was following the Cavalry more slowly. All the explosives of this detachment were carried by the men on their saddles, whilst a few artificers' tools and materials for the repair of telegraphs, etc., were carried in a squadron cart.

In 1885, at SUAKIM, a detachment of one officer and twenty-seven rank and file of the 11th Company R. E., was mounted on horses and taken for employment with the mounted infantry. This

experiment proved so successful that three years later a War Office Committee, under the presidentship of General DRURY-LOWE, recommended the formation of a Mounted Detachment R. E. at ALDERSHOT, with a strength of 37 of all ranks and 38 horses. In the following year, that is to say in 1889, the war establishment of this unit was laid down at 4 officers and 113 N.-C. O.'s and men, with 119 horses and 9 wagons and carts.

Ten years later this unit, under the altered name of the "Field Troop R. E." sailed for SOUTH AFRICA as part of the divisional troops of the Division under General FRENCH. During the course of the War, the large increase in mounted troops necessitated a corresponding increase in mounted sappers, and three additional Field Troops were raised, one of which was disbanded at the termination of the War.

In April 1907, two more were formed: so that we now have five of these units, each with a war strength of 3 Officers and 84 other ranks, accompanied by 81 horses and 7 vehicles. Of these, four Field Troops form the Divisional Engineers of the Cavalry Division of the Expeditionary Force at Home, whilst the fifth is stationed in South Africa.

When the Expeditionary Force was sent to CHINA from INDIA in 1900, a detachment of mounted sappers was organised from the BENGAL SAPPERS AND MINERS, and was sent out with the Cavalry Brigade. It consisted of one officer and about 25 INDIAN rank and file, the majority of whom had, to start with, no knowledge of riding or of horse-mastership. Their equipment was carried on pack horses and mules. On their return to INDIA, the men were drafted off again to the companies from which they had been originally drawn. Orders were, however, shortly afterwards issued for extra enlistments to be made in order to form a permanent Mounted Detachment, Sappers and Miners, with a strength of one officer and about 60 other ranks. This unit holds a complete set of equipment to be carried on pack animals but has no horses. The men undergo a mounted infantry course for one month a year, but for the remaining 11 months they perform all their duties on foot. Whilst this is undoubtedly an economical proceeding in peace time, it is hardly likely to prove so directly this unit proceeds on active service, as the men, from lack of proper training, can only have a rudimentary knowledge of horse-mastership.

A COMPARISON OF CAVALRY PIONEERS AND MOUNTED SAPPERS.

Although the Field Troops now form part of the Cavalry Divisional Organisation at Home, and mounted sappers have practically been accepted as a necessity out in INDIA, still there have not been wanting critics who argue that Engineers are out of place with a mounted force.

Brigadier-General BETHUNE, in a lecture delivered at the Royal United Service Institution, on February 22nd, 1906, after arguing in favour of attaching Mounted Infantry to bodies of Cavalry, states

that—"To follow up this line of argument, we should have to add to Mounted Infantry, Engineer Troops for bridging purposes and demolition : but what we should gain on the one hand by so doing, we should lose on the other, by hampering our Cavalry forces, which should be absolutely mobile, without wheeled transport."

Again, it has been said that with efficient Cavalry Pioneers, there ought to be no need for Sappers, for whom there will be few opportunities for carrying out such work as cannot be equally well done by the Pioneers. That, whilst they may be useful on occasions, still these occasions will be so few and far between, that the permanent attachment of Sappers to Cavalry is only a refinement which absorbs many horses which could be more usefully employed in other ways.

The answer to General BETHUNE'S argument is to be found in his own postulate, that is, that "The Cavalry should be absolutely mobile." Now, the first line transport of a Field Troop R. E., consists of only six vehicles, and of these two might be dispensed with by mounting the men, which they carry, on horses. This can hardly be said to be enough to hamper the movements of a brigade which already has thirty-three first line vehicles, exclusive of any Horse Artillery that may be attached to it. And, indeed, the presence of only one vehicle is sufficient to hamper Cavalry, if they have not the means of crossing rivers or even small streams off the main lines of communication in any country.

In this respect VON BERNHARDI says on page 175 of his book, *Cavalry in Future Wars*, "A wagon of bridging material, just sufficient to cross smaller ditches and water courses which can neither be jumped nor scrambled over, but which require at most only one or two bays, would be invaluable : for it is just these little hindrances whose importance cannot be measured or deduced from the map, which may bring most important Cavalry undertakings unexpectedly to a check, particularly when in an enemy's country all the culverts, etc., have been destroyed."

The ordinary pontoon equipment of the army is, of course, too heavy for this purpose, and the bridging material which would be most suitable, consists of light collapsible canvas boats of the Berthon or James pattern. This is quite sufficient to ferry even field guns across rivers, a photograph opposite page 122 of Mr GOLDMAN'S book, "*With General FRENCH and the Cavalry in SOUTH AFRICA*," gives a good idea of how this equipment is used.

When the Cavalry Division started for the Relief of KIMBERLEY on February 11th, 1900, a heavy pontoon troop was attached to it in case it should be found necessary to cross the RIET River anywhere where there was not a drift available. But even the short march from RANDAM to DE KIELS DRIFT, 14 miles across the veldt, proved too much for the horses drawing the pontoon wagons, and they never arrived until the passage of the river had been effected. It is obvious, therefore, that we cannot rely on the ordinary bridging material which accompanied the army, but that we must have some form of light, portable ferry capable of keeping up with the Cavalry.

The men, of course, will have to swim with their horses, whilst their saddles, ammunition, and such baggage as they have with them, are transported in these collapsible boats, and on such rafts as the Engineers can construct from locally obtainable materials.

To turn now to the second of the objections raised against having R. E. with Cavalry, namely that such work as they will have opportunities to do can be equally well performed by the Cavalry Pioneers.

The experience of the SOUTH AFRICAN War shows that, whilst the Pioneers were a most useful adjunct to the Field Troops, they were not capable of carrying out all the necessary work unaided by the Sappers. It would, indeed, have been strange had they been so able, when one considers the amount of time and trouble that has to be expended in training the Cavalry soldier to his proper duties. To endeavour to make one man equally efficient as a Cavalry soldier and as a Sapper, will probably only result in turning out a man who is only mediocre at both jobs.

Apart from this is the question of the Officer. If we are to have no Sappers with the Cavalry, we are faced with the alternative of brigading the Pioneers of the three regiments of the Brigade. This, it should be pointed out parenthetically, means, in INDIA, only the 16 odd Pioneers of the BRITISH Regiment, since the INDIAN Cavalry have no Pioneers. Supposing, however, that we have some fifty Pioneers thus collected together: if we place an officer of Royal Engineers in command of them, he probably starts on the campaign knowing not even the N.-C. O.'s, to say nothing of the fact that the men do not form a homogeneous unit and that such an officer has had nothing to say to their training. If, on the other hand, we place all the men under a Cavalry officer, chosen from one of the regiments of the brigade, his whole time will be taken up in training them for Pioneer duties, and his regiment will, therefore, be short of one officer. Moreover, it is unlikely that such an officer can be possessed of sufficient technical knowledge to bring his command up to the necessary state of efficiency. For instance, to destroy a railway bridge, so that it will give the enemy the maximum amount of work and trouble to repair, requires a certain knowledge of bridge construction or, if explosives are running short, it may be possible to destroy only a few members of one of the girders, and it is, therefore, essential that the officer carrying out the demolition should know which are the members on which the girder mainly relies for its stability.

Again, supposing a party was sent to cut off the water-supply of a town, which it was hoped we should subsequently capture. The indiscriminate destruction of the pumping station might eventually cause more trouble to our own side than to the enemy, whilst the removal of one or two small but important parts of the machinery would be quite sufficient to cut off the water-supply as a temporary measure. As an instance of this, may be quoted the way in which the BOERS cut off the BLOEMFONTEIN water-supply after

the affair at KORNSPRUIT on March 31st, 1900. The water for BLOEMFONTEIN is pumped in from the MOONDER River, the pumping station being at SANNAH'S POST. When the BOERS got possession of the water-works, they undoubtedly entertained hopes of eventually regaining possession of BLOEMFONTEIN. With this possibility in view, they wished to carry out only such damage to the water-works as would result in a temporary disablement to them. They, therefore, merely removed the slide-valves of the engines. There was no machinery in BLOEMFONTEIN for replacing these valves, which had therefore to be ordered up from CAPE TOWN, and took in consequence some weeks to come up-country. Meantime, the troops in the town had to fall back for their water-supply on the local wells, which had been condemned as unfit for drinking some years before. The subsequent outbreak of enteric fever amongst our troops is a matter of common knowledge. Although the BOERS, of course, did not regain possession of BLOEMFONTEIN, still this instance is instructive in showing how the presence of a man skilled in engineering on such an occasion may be of distinct use in producing the maximum amount of inconvenience to the enemy, without doing irreparable damage to plant which his side hope shortly to make use of. The above arguments and instances have been brought forward with a view to showing that the Cavalry Pioneer is not, by himself, up to all the work that he might be called upon to do unaided on service. Modern inventions are making war more and more complicated every year, and the training of the individual soldier is getting proportionally more important and more difficult. It is generally accepted that the Cavalry soldier requires the highest training of any in the army, and we should, therefore, relieve him as far as possible of technical duties which can be better performed by specialists attached to brigades or divisions for the purpose. That the authorities at Home take this view, is seen by the fact that there are now no Pioneers in the establishment of a Cavalry regiment in ENGLAND. In this country the question has not yet been definitely settled, but everything points towards our having, in the near future, a detachment of mounted sappers with each Cavalry Brigade.

EXPERIENCES OF FIELD TROOPS ON ACTIVE SERVICE.

The following is a short summary of the work done by the Field Troop R. E., during the SOUTH AFRICAN WAR, and by the mounted detachment of the BENGAL SAPPERS and MINERS during the CHINA Expedition of 1900. From these deductions may be made as to the employment of Engineers with Cavalry.

ORGANISATION.

When the Field Troop went out to SOUTH AFRICA, it had a strength of 120 of all ranks, and it was organised in one headquarters and three field sections. During the earlier months of the War, there was a distinct tendency to keep this unit concentrated, as a rule, with that brigade, which was also accompanied by

Divisional Headquarters. This was not economical, as there were too many men for carrying out such work as was required by that Brigade, whilst the other brigades of the Division might be bivouacking too far away for a detachment of Sappers to be sent to them daily to arrange for their water-supply, etc. This was, however, realised, and eventually each brigade used to have its section of the Field Troop more or less permanently attached to it. It will be noticed that the present divisional organisation admits of one Field Troop (of lower numbers than formerly) being attached if necessary to each of the four Brigades. Both in SOUTH AFRICA and in CHINA, practically all the Sappers were mounted, but page 62 of the War Establishments 1908-1909 shows that now, only half of them are mounted, the remaining 18 men being carried on two light spring wagons. This is doubtless done to save horses, a very desirable object, as it means that these 18 men on arrival in camp are all free for work at once, whilst the draught horses are attended to by the drivers of the wagons. On the other hand it limits the mobility of the unit, as the wagons are practically tied to the roads: and, moreover, since the strain of active service tells more heavily on draught horses than it does on ridden ones, it would appear quite likely that the men carried on these wagons may be reduced, after the first six weeks or so of a campaign, to accompanying the second line transport on foot.

WATER-SUPPLY.

* One of the most important duties of the Field Troop in SOUTH AFRICA was the provision of a proper water-supply in camp. One of the features of SOUTH AFRICA is the system of collecting rain water by building "bunds" across the lower ends of the valleys, or of low-lying ground. If large numbers of animals are allowed to walk into these tanks to water, the contents rapidly become undrinkable. To obviate this, the Sappers used, when time admitted, to rig up troughs made out of canvas sheets laced to wooden uprights, the troughs being filled by means of hand pumps. Unfortunately, this pattern of trough took a long time to erect, so that, if the force arrived late in camp, the early watering of the animals became a matter of greater importance than the cleanliness of the water. The result was, of course, that that particular dam was undrinkable for several days after. This has brought out the necessity of having some form of portable trough which can be rapidly erected and taken down, so that it may be worth while to fix it up every evening. Another obvious advantage of watering animals from troughs, is that one can utilise the same supply for drinking purposes. This is an important matter, where the sole supply is from tanks as was the case in the recent MOHMAND Expedition.

COMMUNICATIONS.

Such work as was done under this heading in SOUTH AFRICA, was usually in connection with the transport. The rivers in that

country mostly run between steep and high banks, and the drifts were often badly aligned and very steep. They, of course, did not impede the Cavalry or Horse Artillery to any great extent, but a good deal of spade work was often necessary to assist the second line transport in getting across these obstacles.

As the rivers were always fordable, except when in flood, there was never any occasion for bridging, though the collapsible boats carried by the Field Troop were exceedingly useful at PAARDEBERG. The long and rapid marches of the Infantry Division in this phase of the War had proved too much for the animals drawing the pontoon wagons of the R. E. Field Companies: they had had, therefore, to be left behind. The result was that the Seventh Division which was astride of the river, east of CRONJE'S laager, had no means of intercommunication across the river when it rose in flood. The collapsible boats of the Field Troop were, therefore, lent to this Division, until their pontoons arrived. Subsequently, these same boats worked as a ferry across the river at KODOE'S RAND DRIFT, where the 1st Cavalry Brigade was encamped on the north bank, the remainder of the Division, including the Supply Column, being on the south bank.

When the Division concentrated on the south bank on March 5th, prior to its advance towards POPLAR GROVE, the river was considered to be too much in flood to admit of the Horse Artillery crossing it by the drift. The guns and wagons were, therefore, ferried across, though for this purpose a couple of pontoons were borrowed from one of the Field Companies. It is of interest to note that the three batteries which were taken across this river, which was only about 40 yards wide, took the best part of four hours to ferry over: this shows what a lengthy proceeding such an operation is: at the same time it emphasises the necessity of having some form of portable raft with Cavalry with sufficient buoyancy to carry a Horse Artillery gun.

In CHINA, the Mounted Detachment of Sappers do not appear to have had many opportunities for work in the field, as they were less than one month actually on the march. During that period, however, they had to build a couple of floating bridges, the bigger of which was across the GRAND CANAL near TIULIU. The canal was 170 feet wide and 10 feet deep, and was bridged by means of junks which were found on the spot. The remainder of the work done by this unit consisted chiefly of improvements to the roads, and in making diversions through the fields where the roads themselves had become impassable owing to the mud.

DEMOLITIONS.

There were not many opportunities during the SOUTH AFRICAN WAR for carrying out demolitions of railways. As a matter of fact, the BOERS themselves had usually taken good care to destroy the bridges before even we arrived on the scenes. And such demolitions as the Field Troop carried out, were done more with the idea

of bottling up rolling-stock on the railway, and stopping the BOERS from removing it, than of interfering with their communications.

On the night of March 12-13th, 1900, Major HUNTER-WESTON, R.E., took about half a dozen men of the Field Troop and three Pioneers of the 10th Hussars, and, riding round the BOER lines, he destroyed a culvert on the railway about one mile north of BLOEM-FONTEIN, at the same time cutting the telegraph wires communicating with the North. This party had been despatched from the bivouac of the Cavalry Division, which had, on the evening of the 12th, reached a point some five or six miles south of the town. The Orange Free State railway authorities had been despatching all rolling stock northwards as fast as they could: but the cutting of the railway of course brought all further movements to a stop.

The result of this raid was that 25 locomotives and 108 coaches and trucks, besides a quantity of coal, fell into our hands. This was extremely fortunate for us, as Lord ROBERTS was enabled to send two battalions, two guns and some details off by train on the 15th down south to SPRINGFONTEIN, where they got into touch with General GATACRE, who was advancing up from NORVAL'S PONT.

Another raid, with a similar object, was carried out on May 11-12. The Cavalry Division had reached the VALSCH RIVER on the afternoon of the 11th, and Major HUNTER-WESTON was ordered to move round the BOERS and cut the railway north of KROONSTADT, which was at that time held by the BOERS. That officer took half a dozen Sappers with him and was escorted for a part of the distance by sixty sabres of the 1st Brigade. The latter were, however, sent back after going for an hour or so, as it was considered that a small party stood a better chance of getting through the BOER outpost line. This raid was successful in destroying the railway, but failed in its main object as all the rolling-stock had been removed a day or two before.

In this respect the experiences of the officer who commanded the improvised Field Troop in EGYPT in 1882 are of interest. He volunteered to ride round the EGYPTIANS at TEL-EL-KEBIR, and to cut the railway behind them, seizing the rolling-stock; but he was refused permission to carry out this project. Had this permission been granted, there is little doubt that ARABI PASHA would have fallen into our hands immediately after the battle. While on the subject of railway demolitions, it is of interest to quote General PELET NARBONNE from his book "Cavalry on Service," page 80. He says in reference to the PRUSSIAN Cavalry in 1870:—"A railway was often destroyed quite at will without any order. If a patrol came upon a railway, then, without further reflection, he generally tried at once to destroy it. At that time our Cavalry had no suitable tools for the business, and no practice in carrying it out: and though these were serious drawbacks on many occasions, one might almost call them extremely fortunate ones on others."

The indiscriminate destruction of railway line, however fascinating it may appear to the individual carrying it out, is a thing to be deprecated. Definite orders on the subject should always be given,

as a broken line may cause the enemy no inconvenience whatsoever, and at the same time may seriously affect our own comfort, should we subsequently find that we want to make use of it ourselves.

TRANSMISSION OF INFORMATION.

The history of the Cavalry Division in SOUTH AFRICA does not afford us many lessons as to the strategic employment of that arm. It, therefore, sheds very little light on the difficult question of how we are to transmit the information acquired by strategic patrols in time to be of any use to the Commander-in-Chief.

At the outbreak of the War, our telegraph troops consisted of about a couple of hundred men with about eight cable carts, and about twenty air line wagons. These had to suffice the needs of all the BRITISH forces, both in NATAL and CAPE COLONY. There was no special light telegraph unit suitable for employment with mounted troops: but during the operations round COLSBURG, in December 1899 and January 1900, one section of the Telegraph Battalion (as it was then called) was attached to General FRENCH'S force. This unit accompanied the Cavalry Division during the relief of KIMBERLEY, and was intended to keep Lord ROBERTS in touch with the Cavalry. For this purpose it was equipped with a cable cart which reeled out insulated cable on the ground as it went along. On reaching KLIP DRIFT on the MODDER RIVER on February 13th, 1900, an attempt was made to signal, through this cable, to the effect that the Division had reached that point and secured the crossing of the River—a piece of information which the Commander-in-Chief was anxious to acquire as early as possible, as on it depended the movements of the Infantry. It was found, however, impossible to get a message through, since veldt fires had burnt the wire through in several places. The message had, therefore, to be sent by despatch riders. This is a good example of the limitation of the use of the field telegraph, upon which it is unsafe to rely entirely, for getting back one's information.

Another serious drawback to using cable carts with Cavalry, is the fact that the wire once reeled out, is practically lost to one, unless the Infantry follow absolutely in the tracks of the Cavalry. In this case, one of the Divisional Telegraph Companies could possibly undertake the work of reeling it up. A cable telegraph company has about 90 miles of wire, so that five days marching would see this unit out of wire, after which it would, of course, become a mere incumbrance to the force it was accompanying. In any case, considering the fact that cables are not to be depended upon, being, as they are, so liable to interruption, it is doubtful whether it would be worth while encumbering a Cavalry Division with the nineteen extra vehicles which this unit would bring with it.

The solution of the difficulty appears to lie in the use of wireless telegraphy. We had no practical experience of this form of telegraph during the SOUTH AFRICAN WAR, as it was only in its

infantry so far as the Army was concerned. Now, however, we have two Wireless Telegraph Companies in our war organisation, one is detailed for the Cavalry Division, whilst the other forms part of the Army Troops of the expeditionary force at Home. A Wireless Telegraph Company (which is quite distinct from a Field Troop) is divided into four sections, each capable of erecting and maintaining one wireless station. The equipment for one station is carried on a limbered wagon drawn by six horses. The wagon contains the engine and dynamo which generate the electricity for sending the messages, whilst the limber holds the sending and receiving apparatus, including the aerial which is carried on four telescopic masts forty feet high. It takes thirty to forty minutes to erect the masts and get the station ready for working. Messages can be sent to a distance of fifty miles.

. During the Cavalry Manœuvres at Home last year, this unit was employed as follows:—One central station remained with headquarters, whilst the other three were pushed out—presumably with various reconnoitring bodies. They had orders to open station at certain hours and places for a given length of time. These times and places were made known to all who might require to send messages. Thus, lateral communication was secured between the various separated bodies of the Division. If one of them happened to be on the move at the moment another was trying to call it up, the message was sent to headquarters and forwarded on thence as soon as the moving station halted and opened up again. There was no hitch in the working, and naturally a vast amount of orderly's work was saved.

At the same time it will be noticed that a certain amount of arrangements have to be made beforehand, such as the fixing upon hours at which stations will be opened. Also, it must not be forgotten that, owing to the time spent in opening station, we must limit the number of times a day that communication is to be opened up, otherwise the movements of the body which the wireless section accompanies will be hampered.

Owing to the bulky nature of the paraphernalia required for working this form of telegraphy, its use appears to be restricted chiefly to sending messages from Divisional Headquarters to Army Headquarters, or in communicating with a large detachment. It is conceivable, however, that a wireless section might sometimes be attached to a contact squadron with advantage.

In the Cavalry Manœuvres in the Quetta Division of 1908, three squadrons were sent out from Quetta to back up strategic patrols, who were endeavouring to locate an enemy which was advancing from Loralai. These squadrons formed a considerable detachment from the Brigade to which they belonged, and the difficulty was to ensure that they should all be recalled to headquarters in time for the Cavalry combat, which it was known must ensue. As a matter of fact, all three were absent when the conflict took place. Had the squadron, which was operating on the line on

which it was expected that the enemy would advance, been equipped with a wireless installation, it could have given Brigade Head-quarters intimation, some twelve hours earlier than it did, of the main body of the enemy's Cavalry. On this information, the Brigadier could have recalled at least two of his contact squadrons in time to be present at the fight.

GENERAL CONCLUSION AS TO THE EMPLOYMENT OF ENGINEERS WITH CAVALRY.

It will be seen that the duties of Engineers attached to Cavalry do not differ, to any extent, from those of that arm who are attached to Divisions. But in order that they may be able to co-operate properly with mounted troops, it is essential that they should train with them in peace, and so become conversant with the methods by which Cavalry carry out their duties. It is not, therefore, rational to expect to raise an efficient unit, when war breaks out, by mounting upon horses men whose whole peace training has imbued them with ideas of time and space derived from an association with the dismounted branches. For instance, in passing an obstacle, such as a river, it might be quicker for Cavalry to make a detour of some miles in order to secure a better crossing; whilst with an Infantry Division, it would be more economical of time, and at the same time less fatiguing to the majority, if the obstacle were crossed where it was met, though a better crossing might be available some miles off. In this case, the Engineers would most likely have a lot of heavy work to do, such as would neither be possible nor perhaps even desirable for the Engineers accompanying a mounted force. Cavalry moves so quickly that there is no time for making elaborate improvements to a road, and only those who have had to carry it out can fully appreciate the relatively small amount of digging that can be done to help an army over a bad bit of road, in the limited time that is usually available.

As before stated, this work of improving communications will be generally carried out for the benefit of the transport; but this is no argument for keeping the Sappers far back in the column of march. Apart from the fact that they may be very useful in helping the Horse Artillery over really bad places, they should be kept well up in front, in order to give them time to reconnoitre for the best river and *nala* crossings, etc., and to improve them before the arrival of the transport. It is suggested, therefore, that the correct position for them on the line of march is with the Advanced Guard, unless a collision is imminent. In the latter case they might, if the country is very much intersected, accompany the Horse Artillery for whom they could find the escort and ensure greater freedom of manœuvre. This employment of the Engineers would set free a corresponding number of Cavalry soldiers for the Cavalry fight, and is therefore economical.

Another duty that demands that the Sappers should be well up in the line of march, is that of arranging the water-supply and communications at the end of the day, when the force reaches its camp.

To make arrangements for the watering of a large number of animals quickly, is a matter which requires a good deal of working out, especially when the water-supply is limited. There is a point also which must not be lost sight of, namely, that troughs should be full before any animals are allowed to start watering. This is necessary because the water is drunk up quicker than it can be pumped in, unless a large number of pumps are available. To avoid delay in this matter, therefore, the Engineers should be the first to reach camp, being sent on ahead of the column for this purpose, if the tactical situation admits of it.

The extent to which modern armies depend upon railways for their supply, renders them very sensitive to attacks upon their communications. To do a large amount of damage to a railway requires a large number of men; and it is a matter of history that Cavalry raids on a large scale often only result in that side, which so uses its Cavalry, feeling the want of them at a time when they can least be spared. A good instance of this is the misuse of STONEMAN'S Cavalry in carrying out a raid against LEE'S communications just prior to the battle of CHANCELLORSVILLE.

But very considerable damage may be done by a few men, expert in the use of explosives, if they can manage to blow up an important bridge on the enemy's line of communications.

Apart from the material damage and the increased difficulties of getting up supplies of all kinds, there will be created in the mind of the hostile commander a feeling of anxiety prompted by the knowledge that hostile detachments are in his rear, and tampering with his communications.

As an instance of this may be quoted the raid made by Colonel NAGANAMA on the RUSSIAN communications north of MUKDEN. The presence of these 160 JAPANESE Cavalry within striking distance of his communications caused the RUSSIAN Commander to detach a large force of his Cavalry to watch his right flank. These were, therefore, unable to take part in the battle of MUKDEN.

In enterprises of this sort, the mounted Sapper should be very useful. His knowledge of explosives enables him to place the charge where it will give the best results; and, what is even more important, he will carry out the work quicker than an untrained man. This is a matter of great importance, when we consider that all the larger railway bridges are sure to be guarded, and that even if the guard are overpowered, they will almost certainly have signalled the arrival of the raiding party to the nearest post, who would of course hurry to their help.

It should be pointed out that a small raiding party cannot undertake any very large demolition, owing to the difficulty of carrying sufficient explosives. As these have to be carried on the saddle, it means that if the party is small, the men have to carry individually heavy loads: on the other hand, if it is essential that the horses be lightly laden, then the party must consist of a larger number of men: and it should hardly be necessary to point out that

in enterprises of this sort, the fewer men there are, the better chance they have of succeeding.

In the matter of technical reconnaissance, the Engineer Officers attached to a mounted force ought always to be on the look out for obtaining and sending back information on various matters which will facilitate the advance of the Main Army. For this purpose, the C. R. E. of the Cavalry Division should have access to all the reconnaissance reports furnished by patrols. He will then be in a position to judge which are the best roads for the Main Army to take, and to make recommendations accordingly.

He should also be able to send back information as to the extent of damage done by the enemy to the bridges, railways, telegraphs, etc., and as to the materials available locally for the repair of the same. This would give the Chief Engineer a good idea of the amount of materials he should order up, and he would, moreover, get the information early and so be better prepared to cope with the difficulty. To give an instance, let us suppose that the Strategic Cavalry have come to a river across which all the bridges have been broken. Near one of these demolished bridges, however, a sufficient number of boats and barges are found to make a floating bridge. This information the C. R. E. of the Cavalry Division should send back to the Chief Engineer of the Army, who would then arrange for the Bridging Trains to accompany those Divisions which had to cross the river at points where there were no boats, etc., available.

CONCLUSION.

In conclusion it is submitted that, since Cavalry will, in the future have, more than ever, an independent rôle in warfare, and will consequently have to operate at considerable distances from the Main Army, they must be independent also in the matter of having their own Engineers. These must be self-supporting, that is to say, they must consist of men qualified to carry out any jobs in Telegraphs, Railways, or General Engineering that may present themselves, until the special R. E. units of the Main Army can take them over, or the necessity ceases.

These men should be all mounted on horses or cobs, and not carried on wagons, since, as has been shown, the breakdown of one wagon from any cause may mean the loss of eight men to a unit which is none too big as it is. At the same time, the men should be imbued with the spirit that their horses are, like those of the Mounted Infantry, only a means to an end; that is, a means of enabling them to keep up with a mounted force, in order to be the better able to carry out their technical work. And lastly, every opportunity should be taken in peace time (with special reference to INDIA) for training these technical troops with the arm which they are intended to help on service; this is the only way to secure a mutual understanding of each other's capabilities, and thus foster that spirit of co-operation without which the best troops will fail when subjected to the supreme test of war.

A NEW COMPASS FOR NIGHT WORK.

The want of a serviceable compass for night work has often been felt, and the conditions of modern warfare tend towards the further development of night operations and to enhance the value of accurate reconnaissance and leading of troops under cover of darkness.

Lient.-Col. C. W. Somerset, 48th Pioneers, has recently invented and patented an electrically-lighted prismatic compass, called the "Primus," which can be read as accurately by night as by day.

The compass is modelled upon the well-known lines of Hutchinson's Prismatic Compass, and measures 3 inches in diameter and weighs in its case 13 ozs. For night work a metal cap, containing a small "pea" electric lamp, is pushed into a dovetailed groove close up to the prism box, and double wires, on the free end of which is a plug, lead to the accumulator, carried in a leather case attached to the waist-belt. To make or break the connection, it is only necessary to push in or pull the plug from its socket on the top of the leather case. To facilitate reading off a bearing by night, a small white index is fitted, to be seen under the prism and coinciding with the vein of the foresight, so that accuracy is assured. Care should be taken to see that connection is broken when observations have been completed in order to preserve the life of the lamp and accumulator. The latter, in case, measures $5\frac{1}{2}$ inches by 3 inches, and weighs about 21 ozs. Accumulators can be re-charged at any small electrician's works at trifling cost. Cells for re-charging accumulators, 12s. 6d. per set.

Price of compass, complete, £3 12s. 6d. Sole makers, Messrs. Francis Barker and Son, Ltd., 12, Clerkenwell Road, London Messrs. Treacher and Co., Bombay, are the agents for India.

Figure 1 shows the method of attachment, and Figure 2 the compass complete, as carried.

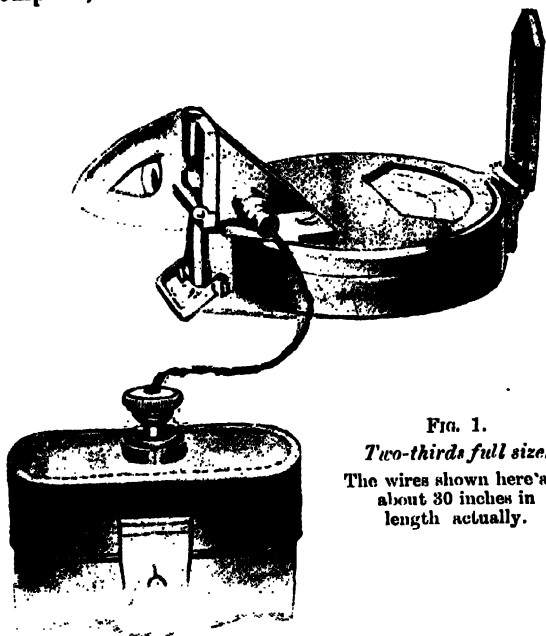


FIG. 1.

Two-thirds full size.

The wires shown here are about 30 inches in length actually.

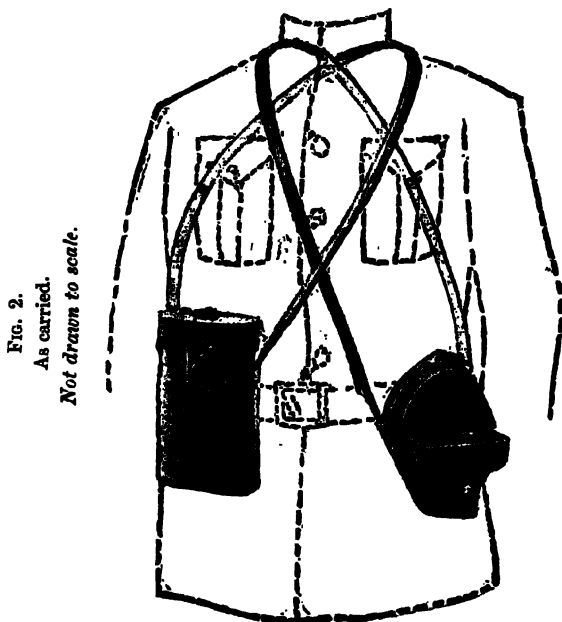


FIG. 2.

As carried.

Not drawn to scale.

PRECIS OF FOREIGN MILITARY PAPERS.

RUSSIAN PAPERS.

(Sbornik, July 1909.)

MACHINE GUN QUESTIONS.

The author, C. Fedoroff, in this article, gives a description of the first formation of machine gun companies, in the Russian Army.

To commence with, 5 machine gun companies were formed, one with the 3rd East Siberian Rifle Brigade and the remainder with the 4th, 6th, 8th, and 16th Infantry Divisions, in the Warsaw military district 8 machine guns per company. The guns were not of a field pattern but mounted on gun carriages, with high shields, of a type used in fortresses. Later on they adapted the gun to an ammunition two-wheeled carriage, converting it into one for two-horse draught.

In the first year of their formation, they were inspected by Major-General Nischenkoff, lately returned from the China War, where machine guns had played an important part. At this inspection, the companies were put through a searching test, and given much useful advice and instruction of a practical nature.

The war with Japan commenced three years after the companies had been formed, and they were then in excellent order. In the first action at TIURENCHEN, the company of the third East Siberian Division acquitted itself admirably.

It perished here in a glorious death.

Following on this, the remaining four companies with guns mounted on two-wheeled carriages were despatched to the front.

They also greatly distinguished themselves at LIAO-YANG, SHAKHEI and at MUKDEN.

Soon after this two transport companies were formed, the guns being mounted on tripod stands, with pack equipment of the pattern used in Switzerland, but with dismounted establishment.

The Officers' Musketry School contributed largely to the raising and preparation of machine gun companies. After one year it had instructed in the machine gun, 495 officers, 12,320 rank and file on the cadres of 44 machine gun companies. The companies sent out (except the 4 original ones) were engaged only at MUKDEN. They acquitted themselves admirably.

At the very commencement of the war the Japanese experienced great difficulties, as their knowledge of machine guns was less than the Russians.

After the action at TIURENCHEN, where the Russian machine guns did excellent work, the Japanese were compelled to set about providing their army with more guns, which they took from the fleet,

They also obtained many from America and Europe.

After long experience, the Russians invented a good method of setting up machine guns on stands, which can be used as stretchers for carrying the fallen, and for shooting, sitting or lying.

They are provided with a small and light removable shield.

In 1906, the former machine gun companies were re-organised in detachments.

Detachments with four machine guns were given to Infantry Reserve and Rifle Regiments, and in this way formed an integral part of a Regiment.

The Commanding Officer of a detachment is selected from the ablest of the officers, not below the rank of Lieutenant, and receives 180 roubles table-money.

The author goes on to say that what is necessary for the Russian Army is, a well founded institution for carrying out instruction, on one uniform system, in machine guns and their duties.

This he says may be done in one of three ways.

Either by transferring the whole of the work to the Inspector-General of Infantry, or by making a separate Inspector of machine gun duties, or by re-creating, as formerly, an Inspector of Musketry adding to his duties that of machine guns.

The last method appears most feasible, and machine gun work ought not to be separate from Musketry work. There already exists an Officers' Musketry School. The School should have a special machine gun branch. In this branch, there should be an instructional course with a sound and well-thought-out syllabus of work.

Every year, one officer per division and two under officers per detachment, might be put through this course.

The Officers' Cavalry School would have to keep abreast of the times in everything pertaining to mounted machine gun work.

According to the present regulations, an officer not below the rank of Lieutenant is selected for the command of a machine gun detachment and receives 180 roubles table-money. It is not at all easy to find such a junior officer, capable and willing, to perform such complex duties.

The remedy suggested is, that machine gun "detachments" should be styled "companies," and the Commanders of such "companies" should be given the rank of Captain with an increase of pay, equivalent to that of a Captain commanding a company.

In Germany, the Commanders of machine gun companies are on all fours with Commanders of regular companies.

There are now 50 of such companies and their numbers are to be increased.

The author is of opinion that the surveillance of machine gun commands should be entrusted to Captains, who had formerly commanded machine gun detachments, and not to Staff Officers, as the prevailing system is.

He ends up by saying that if machine gun "detachments" were called "companies," all these difficulties would be materially diminished.

RUSSIAN PAPER.

Sbornik, July 1909.

THE GREAT CAVALRY CHARGE IN THE BATTLE OF LEIPSIC.

CONSIDERED IN A NEW LIGHT.

Major Friedrich of the Prussian General Staff, in the third part of his work "Geschichte der Befreiungskriege, 1813-1815," views this charge in a totally different light, denying its premeditation, but especially in saying that the number of French squadrons, which carried out the charge on the Allies' centre, instead of being 80-100, was only 18 squadrons. Such an explanation totally differs with what we have been accustomed to believe for nearly 100 years.

The third part of Friedrich's work (from the action at Leipsic to the end of the war) is gleaned from the researches of 71 sources. How sound the deductions may be, the reader must judge for himself.

For convenience of comparison of both descriptions, a brief sketch of each is given. The old one:—

About 3 P.M., when the French had already repulsed the Russians, Austrians and Prussians on the line near VAKHAU, Napoleon in order to pierce the long-drawn dispositions of the Allies on the right bank of the PLESY decides to throw into the attack the bulk of his cavalry. Twenty squadrons of Kellerman are withdrawn from the French right flank at MARKLEBERG and thrown against the Allies' left flank, but are met by the LUBENSKI Hussars and afterwards by 6 Austrian Cuirassier regiments under Count NOSTITZ and other corps, and are thrown back. At 3 P.M. precisely Napoleon hurls against the Allies' centre 80 squadrons under Murat. Sixty guns under Druôt prepare the way for this charge, opening an overwhelming fire from a position east of VAKHAU. The French cavalry emerging from VAKHAU take a line towards GULDEN-GOSSAYE. It carries everything before it and reaches the ponds of GOSSY close to the rising ground where the allied monarchs and the Commander-in-Chief Prince SHVARTZENBURG are met together.

At this moment Count Orloff-Denisoff takes the Cossack body-guard and charges the flank of the Cavalry mass. The French, taken by surprise in flank, are unable to seriously oppose this handful of Cossacks.

The Guards Cavalry and Cuirassiers opportunely arrive, and with a vigorous onset crumple up the French Cavalry, which struggles

back, accompanied by the fire of the Reserve Artillery, which has come into action on the position. Such is in broad outline the course of events according to existing accounts. Sometimes Kellerman's and Murat's charges are described as one general charge, undertaken by a mass of 100 squadrons.

Friedrich's account:—About 2-30 P.M. General Bordesoul decided to take with his Division (18 squadrons) the Russian batteries in front of him. He sent four squadrons of Saxon Cuirassier Guards against a Russian battery on the right and himself with Supransi's leading brigade made for the massed battery on the left. He ordered the 3rd Brigade under Bessiera to follow in reserve.

The first blow of this mass of cavalry descended on Prince Wurtembur's greatly weakened battalions. Supransi's Brigade became disorganised. Bessiera's Brigade which was following in the 2nd line pushed on to meet the Russian Cavalry coming out of GULDEN-GOSSY. They were now making for the embankment between two ponds. The low ground west of GULDEN-GOSSY had become marshy from rain. Bessiera's Brigade succeeded in crossing it. To repulse the Cuirassiers who had crossed the dyke and were hastening on to the hill were only three squadrons of the Cossack Body-guard.

Further on Friedrich's account scarcely differs from others, and comes to the following conclusions:—

Count Orloff-Denisoff repulses the Cuirassiers, crosses the dyke and charges Bessiera's left flank. The Reserve Artillery opportunely arrives and opens with grape on the French Cuirassiers, who, disordered, scurried back to Druôt's battery. Fresh detachments of French Cavalry moved out in front and covered the retirement.

This stirring cavalry charge thus results in the charge of one Cavalry Division that is not more than 2,500 sabres. In this way one may account for its ineffectual results.

REVIEW OF BOOKS.

Guide to Promotion for Non-Commissioned Officers and men of the Royal Army Medical Corps, by Captain S. T. Beggs, M.B., R.A.M.C., (Reserve of Officers). This is the second edition of a work published by Gale and Polden, Aldershot, and the special features claimed for it are (i) the concise form in which information is conveyed by questions and answers, (ii) the illustrations of surgical instruments and appliances, and (iii) the assistance afforded by the appendix to young Non-Commissioned Officers recently promoted, in routine clerical duties.

After carefully perusing the book it is considered that the above claims have been made good and that the work, which contains a chapter on Semaphore Signalling, can be confidently recommended as a reliable and up-to date guide to promotion for Non-Commissioned Officers and men of the Royal Army Medical Corps.

The price, it may be noted, is three and six pence.

An Introduction to Military Geography, by Brigadier-General E. S. May, C.B., C.M.G., Hugh Rees, Limited, 119 Pall Mall.

This book of General May's is, in effect, a plea for the study of geography by soldiers. It demonstrates the close connection between geography and the operations of war and shows how greatly a knowledge of the former conduces to success in the latter. General May also points out that geography, in the military sense, is a wide subject and must be taken to include the physical geography and conditions of season, weather, tides, communications and productions of the regions under consideration.

The different geographical features and conditions, such as valleys, rivers, canals, fogs, rains, etc., are discussed with reference to the effects they may have on operations and numerous examples of each case are given in illustration.

That portion of the book which deals with mountains is of special interest to soldiers in India. Some striking examples are given of how, in past times, the Hindu Kush and Himalayas were successfully traversed by large armies; at the same time it is shown further on in the book, that such performances are not likely to be repeated under modern conditions without the help of railways behind the Army attempting them. There are, also, chapters on the military geography of Persia and of Afghanistan and the N.-W. Frontier.

The book is plentifully supplied with maps and its perusal should convince the reader that, as stated in the work, "in selecting a Commander for a certain enterprise it is no little recommendation that he should know the country."

Strategy of the Franco-German War, by Brevet-Major W. D. Birp, D.S.O., Hugh Rees, Limited, 119 Pall Mall.

A reproduction of some lectures on the strategy of the 1870 Campaign, which were given by the author while he was a Professor at the Indian Staff College.

The strategy of the war during its first phase, i.e., up to the capitulation of the French at Sedan, is dealt with from both the German and French points of view, the two points of view being arranged separately to facilitate study. The facts have been taken from the Official Accounts and the book affords, in convenient form, a means by which the strategy of the operations may be followed.

There are numerous plans giving the positions of the opposing Forces from time to time; these plans also show the supposed position of each Force as estimated by its opponent.

At the end of the book are some strategical problems suggested by the operations; there are also tabular statements giving the French and German organisations and the strengths and dispositions of the different Armies during the course of the campaign. Maps of the road and railway communications used are included.

The book can be recommended to the notice of those who may wish to study the strategy of this campaign.

ACKNOWLEDGMENT.

We have to acknowledge with thanks the receipt of the following new books:—

German Official Account of the Russo-Japanese War.—The Battle of Liao-Yang, by Karl von Donat. Price 10s. 6d. net (Presented). Hugh Rees, Limited, London 1909.

Story of the Franco-German War, 1870-71. From 15th July to 18th August 1870, by Lieut.-Col H. M. E. Brunner. Price 5s. (Presented). Forster Groom & Co., Ltd., London, 1909.

Organization, Administration and Equipment made easy. By Lieut.-Col. S. T. Banning, 9th, edition, revised and brought up to date by Captain R. F. Legge. Price 4s 6d. net (Presented). Gale and Polden, Ltd., Aldershot, London. 1909.

How to keep "Fit" or the Soldier's Guide to Health in Field, Camp and Quarters, by Surgeon-Major H. Waite. Price 3d. (Presented) Gale and Polden, Ltd., Aldershot.

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FOURTH ESSAY.—(*Commended.*)

By MAJOR G. F. MACMUNN, D.S.O., R.F.A., *p.s.c.*

Motto:—"QUARE FREMUERUNT GENTES."

"The future of the Native Officer, the extent to which the system of direct commissions as opposed to promotion from the ranks should be resorted to. The scope of his employment, and the possibility of providing for him a wider career whether within or outside of the army, having regard to past history, present conditions and aspirations."

TREATMENT OF THE SUBJECT.

PART I.—THE NATIVE OFFICER OF TO-DAY.

Present status and prospects.

Duties and responsibilities.

Is he equal to his work?

Summary.

PART II.—HISTORY OF THE NATIVE OFFICER.

PART III.—FUTURE OF THE NATIVE OFFICER.

A.—THE UNDER-OFFICER.

His scope and efficiency.

B.—THE WIDER SCOPE.

India's share in the army.

Political dangers.

Suitability of natives of India as Officers.

Practical difficulties.
 Wider spheres in the army.
 Palliatives.
 Qualifications for appointment.
 Employment outside the army.

PART IV.—RECAPITULATION.

PART V.—CONCLUSIONS.

The future of the Native Officer is a question in which probably the whole future of the native army is also wrapped up. It will not be long before some echo of the agitation, that is moving other educated branches of Indian society, will find its way to the army, an echo disciplined and respectful no doubt, but at the same time one that it will be well to forestall by the possession of defined views and policy on which any action must be taken. The question, too, has a far wider side than that suggested by the present position of the native commissioned grades, and here we are up against a point of definition. What do we mean by "Native Officer"? Our present Native Officers are in reality *sous-officers* and nothing more. They are officers with a limitation, and a limitation so hard and fast that it has practically never been overstepped. There is no wall so steep and no barrier so forbidding as that which stands in India between the position of *sous-officers*, enjoyed by the native soldier, be he never so gallant, never so devoted and never such a leader of men, and that of officer, with the baton in his havresack. Whether it be good or whether it be evil, such is the position in the Indian army.

As it is certainly in the broader application of the term 'officer' that the subject is to be interpreted, the question of the higher employment of natives in the army and the problems that the institution of the Imperial Cadet Corps has precipitated will be discussed among the other issues.

To understand the present position with its advantages and its difficulties, it is necessary to follow the past history of the employment of natives of India in the commissioned grades of the army, and it is proposed to discuss the subject of the essay under the following main headings:—

- I.—The Native Officer of to-day.
- II.—The Native Officer in the past.
- III.—His future position.

It is in this third category that the essential difference between officer and under-officer must be enlarged on.

PART I.—THE NATIVE OFFICER OF TO-DAY.

Present Status and Prospects.

The Native Officer of to-day and of the last few years consists of two different classes, with the usual exceptions where the classes overlap. He of the first class comes from the yeoman peasant or

yeoman farmer class and wins his way to a commission through years of good, gallant, and faithful service. He, in most cases, has that peculiar charm which years of discipline, self respect, and minor command, gives to the veteran class all the world over, added to the manner of the East. He is the trusted friend and faithful co-adjutor of the British Officer. To such as he, for nine out of ten, the prospects now open are likely to be ample. The *Sirdar Bahaduri*, a *Captancy*, a *Jaghir* and an A.-D.-C.-ship are all that the most expectant could wish for. From the Transborder the social class may now and again trend higher, but it is mainly the same.

The second class consists of those men who, coming usually from a slightly or even a considerably higher social or more wealthy grade, are given direct commissions, sometimes because of their family's position in the country, sometimes because of the good services of their forbears. Marching with the times they often come into the service with some considerable amount of education, and rise to seniority while yet young men. A first class man who has had opportunities or a little luck, may be *subahdar-major* of his regiment at an age when men of the foregoing category would be just reaching the lowest commissioned grade. It is here that the pinch of the shoe is noticeable as regards prospects. The following concrete instances explain the trouble. In one regiment a direct commission man has been eleven years *subahdar-major* of his regiment, and is not much over forty if as much—a strong, self-reliant, well-educated man of good family and much local influence, with some confidence in his own powers. Almost the only possible advancement open to him is the not altogether enviable appointment of British Agent at Kabul, for which there may be many candidates. In another, a *subahdar*, also a direct commission, who pays his own bailiff three hundred a month to administer his estates, in order that he may serve, is when in the beginning of the prime of life without any prospects of advancement. These two instances suggest the necessity for definitely making up our own minds as to the policy to be adopted, a question which will be considered a few pages hence. Such, then, is the status and prospects of the native officer to-day, who exists in two distinct types. First the man of respectable but comparatively humble birth, who attains, at the end of a career of hard work and simple duty, a position and competence suited to his station; and secondly, a man from a rather higher grade, or at any rate from a grade in which position and prospects and education are on a higher plane, who, when in the early prime of his life, attains to a position that brings him up short before a blank wall.

Duties and Responsibilities.

The duties and responsibilities of a native officer of to-day have gradually been perforce cribbed and confined to some extent from the original conception of the post-mutiny irregular construction. He has, however, the definite duties of command and administration

of troops and companies to deal with. In some form, he is a definite necessity in the military hierarchy, and there is no question of his being redundant. The increased number of British Officers with corps has to a great extent prevented him from having to take up the higher responsibilities that were his in the old days, but they have not interfered with him in the ordinary responsibilities of his proper position. Were he abolished, some other native ranks would be required in his stead. A double company cannot be run without subordinate company commanders and a squadron without troop leaders. It is not necessary to enter into the detail of his duties. Those of the usual regimental grades are well understood, and are the foundation on which all the rest of the military building must rest. It is sufficient if it be acknowledged that the existence of a native officer is essential, both for regimental duties and for keeping a necessarily alien officer in close touch with the men. The real question is not whether he is wanted or not, but what class he shall be drawn from, and if from a higher class, how should he and how can he be given a further career, if such be advisable?

Soldiering in the Native Army is ceasing to become the satisfying career that it used to be. The emoluments of the soldier, even though increased from time to time, do not compare with their value in the old days of cheap prices. The prestige and privileges attached to the position are less, and they are so in obedience to a law which operates in all countries.

- 'When danger threatens and war is nigh,
God and the soldier is all the cry;
When war is over and the trouble righted,
God is forgotten and the soldiers slighted.'

In other words, when a country is recovering from war, when war and risings are still probable, and when the rulers and the magistrates only ride at ease in the saddle by the protection of the sword, the soldier and the ex-soldier receive much attention. As the country gradually becomes settled, the arts of peace revive, and the man of peace is thought more of than the man of war. The services of land settlement, of survey, of agriculture, and of irrigation come to deserve well of the people and the government, and their employes are the men whom the civil authority has to foster and to keep efficient. That is to say, the soldier drops into his place as one among many servants of the State and is no longer fostered with exclusive privileges. This is the state of affairs in India now, and a perfectly natural one. The old soldier or the pensioned native officer is no longer a man of great position and influence in his own circle. The Thanadar, the Extra Assistant Commissioner, *et hoc genus omne*, have far more influence. To quote the poet again "Tommy sees and Tommy's not a fool." How many are there of us who have not seen some magnificent old veteran Sikh or Rajput or Pathan come in with a sniffling lad at his heels who says "good marning sar," and to whom the old man points with pride as "first standard pass." Truly the pen is mightier than the sword, and the man who

rode with Nicholson to Delhi or who followed Vonsden in the Chardeh valley tells you frankly that the pay and position in the *mulki* is far better than that in the *jungi*. Even when he deplores his offspring's lack of martial qualities, he admits that he has taken the wiser course of life. To what extent the soldier valued his old privileges, was amply shown in the Mutiny, when it was fully recognised that the loss of position following on Oudh becoming a British province contributed considerably to the causes of dissatisfaction among the soldiery. This loss of position was due to the fact that when Oudh was a Native State the Resident presented to the Durbar any petitions from soldiers who came from Oudh, while on the annexations, the soldier's petition became only that of an ordinary subject. As most of the Bengal Army came from Oudh and had agrarian complaints to make, the change in status was much felt. The change of times, and the ordinary march of peace and plenty have taken much of the gilt off the soldier's gingerbread generally, and the native officer's in particular. Such local position as the retired native officer gets is either due to the efforts of Government to foster his *izzat*, or by the special attention that some civil officers may care to pay, in tribute to their recognition of the power behind the magistrate.

Is the Native Officer equal to his work?

Another question which must be decided before entering on the larger question, is whether or no the native officer is now fit for the work that is demanded of him. The last few years have immensely enhanced the standard required. No longer does it suffice to have the man behind you who is staunch and will never leave you. Something more is required than "Draw swords and hulla." Rightly or wrongly, we expect them to understand tactical and musketry theories, to have a bowing acquaintance with signalling, and a smattering of much of the more advanced military knowledge that "C" and "D" requires of the British Officer. This means that a comparatively high level of intelligence is demanded. Most commanding officers have had the wisdom to temper their demands with patience, and not make the last years of an old man's service a horror to him by demanding new tricks, but in all new promotions a nimble brain is looked for. In the direct promotion and in the promotion from the ranks, the demand is for the man of some education. Unfortunately education has at present a demoralising effect on the fighting properties of the Asiatic, and the danger of too much brain is the glib N. C. O. and N. O. whose heart is not staunch in the hour of danger. Far better the staunch old "Draw swords and hulla" ignoramus than the good drill who has cold feet. The demand for the higher training which is so essential, if a highly trained army that must compensate for lack of numbers by skill is to be produced, is one that must to some extent be met. The problem to be faced is to get the amount of knowledge we want out of the native officer without sacrificing much of his fighting instinct.

It is being solved by well managed corps on the existing lines of promotion and appointment to the commissioned grades.

Summary.

The salient points that have been elicited, therefore, seem to be much as follows :—

- (1) The native officer, as we now know him, is required from the very nature of modern military requirements, to have considerable knowledge of all sorts.
- (2) His presence is necessary, either in the commissioned or in the higher non-commissioned ranks, for the business of command and administration.
- (3) The present system of promotion from the ranks, if the education tests are wisely and not ruthlessly applied, gives us men fit for their position in many ways.
- (4) The promoting from the ranks gives us a useful native officer who is contented with his lot. The appointment to direct commissions gives us a capable man, but one with aspirations that it is not at present possible to fulfil.
- (5) The present system of direct commissions has no goal as the result of its policy, and carries us to an end that has never been thought out.

PART II.—HISTORY OF THE NATIVE OFFICER.

The history of the evolution of the native officer is interesting. We first hear of him made in the earlier days of the Company's Forces, an actual responsible officer, at times commanding bodies of troops, at others holding positions of full responsibility under the very few British officers that the Company could or would afford. This period gradually merged into that when more imperial responsibility was forced on the merchants, and the trend of circumstances brought them into collision with native powers, and even sent them into the field as allies of aggression. This produced the demand for a larger army, and the necessity for more British officers. The coming of the British Line Regiments to India resulted in the Line system being gradually adopted. With British company commanders, the position of the native officer changed at once, and he became what he so long remained, especially in the Bengal Army, simply a useful go-between of the British officers and their men, and a position of ease and dignity to which the old and faithful soldier could attain. The long periods of internal peace, which preceded the Punjab wars, had gradually made the native officers extraordinarily effete, old, and inactive. It was only in those regiments that went through the purge of the first Afghan war, that a better state of things ensued. It gradually became an institution that the oldest soldier in each grade got promotion, and a native officer's position gradually ensued as a matter of right to be who would live long enough. The same, it may be said, applied to the promotion of the

Company's British officers. The recognised policy of the immediate pre-mutiny period is clearly explained in the chapter of Herbert Edwardes' "Year on the Punjab Frontier," in which he expresses surprise and pleasure at the efficiency of the Bombay troops, who arrived to take part in the siege of Multan. He found the efficiency of the native officers and non-commissioned officers very marked and far superior to that of the Bengal troops. This he ascribes to the fact that a very dangerous habit of selection prevailed, by which men were promoted to these posts for their efficiency and not for their seniority, thus building up a military caste based on soldierly qualities. This illustrates the Bengal principle, which relied on British officers for leading and training, and the native ranks for the mere routine of controlling a docile soldiery. Herbert Edwardes thought the Bombay method very dangerous, though admiring the good results. Edwardes was himself a Bengal man. It is interesting to remember that it was the army managed on the non-dangerous principle that broke away into hopeless mutiny. This also explains the very high soldiering prestige that attached to the Bombay Army. It also accounts for the utter breakdown of the native officer in Bengal in 1857, when he failed equally either as the trusted go-between and confidant, or as a leader of the rebels. With one or two notable exceptions these effete old men were tipped over the precipice of rebellion, which they could neither quell nor lead. What the native officer was in the thirties and forties, may be further gathered from the pages and illustrations in "The Adventures of a Griffin." The stout, effete, old men who are therein portrayed were a laughing-stock to the younger officers, who were impelled to play jokes on them.

The irregular army was, however, managed on quite a different system. It was mostly cavalry, but irregular infantry corps also existed locally. With very few officers the native officers enjoyed a position entirely different from that of their confrères in the Line. Their position and responsibilities were far greater than those of officers and even squadron commanders now-a-days. They had many privileges and much latitude. They came too from a different class. Many a leader of Pindaris or irregular troops in the service of a Native State gladly took service with the upper hand. They were often men from the Afghan border, who had come to hack their way to power. Settled on their land, their children for a generation furnished some of the first material in the irregulars. Glad to find bread from the conqueror in the first instance, they were proud to accept any position. During the Mutiny they were much stauncher than the cavalry of the Line.

When the post-mutiny reconstruction was commenced, salvation was believed to lay in the irregular system, and every native corps was therefore reconstructed on the irregular basis. Such a system was no doubt well suited for the immediate work in hand, *viz.*, the pacification and preservation of internal India. As, however, once more the finest fighting men in India in frontier country had to be

faced, while the Russian menace developed very tangible form, the cry for modern training and more British officers was raised. Gradually the whole Native Army has changed its position, and the Native Officer has become the capable under officer we now know, not so restricted as the old pre-mutiny gentleman, but still with little real responsibility. A system of selection, however, ensured that he was the best of his kind. Old hands of the Cavalry spoke contemptuously of the dragooning of the irregular cavalry, and so forth, but it was a natural development rather than the adoption of a mistaken policy. Except, however, in the very early days of the Company's Armies, and the time after the Mahratta and Pindari wars of the first quarter of the last century, when leaders of horse came over with their men to enjoy very superior positions, there was never any attempt to let natives of India share in the higher ranks. The exceptions mentioned too were only incidents and not a policy. Such incidents too would be the employment of the Sirdars who raised horse for us in the Second Sikh War and the Mutiny, *e.g.*, the Mooltani Sirdars of the Derajat, who rode under Herbert Edwardes and ever after have done so much service in the Silladar Cavalry, and many another. They have gone away with titles and honours, but never with relative position.

The foregoing in brief brings the situation up to that already described as the present situation.

PART III.—THE FUTURE OF THE NATIVE OFFICER.

The subject of this essay specially demands discussion on the following heads:—

- (1) The extent to which direct commissions as opposed to promotions from the ranks should be resorted to.
- (2) The scope of the employment of the Native Officer.
- (3) The possibility of a wider career within or without the army.

It is necessary to disentangle the issues somewhat. The "under-officer" is a necessity in the arrangement of a native regiment, both as a subordinate commander and as a position to be aimed at by the rank and file. He is worth his money to Government and has to be provided as a matter of pure business.

It may be accepted as an axiom proved by our experience in wars innumerable, that the Asiatic soldier only fights up to his full power when commanded and led by British officers. So much has the truth of this been recognised that now with the widening of the field of action before the Indian Army, the number of British officers has been increased at a very heavy recurring cost. White officers and plenty of them are required to enable the Indian Army to fight at the top of his form. The wars that are to be encountered now-a-days only admit of top form. This in itself limits the possible higher employment of natives of India to men who are born leaders. The still existant magic of the white presence can only be emulated by a native who has been thrice selected for his natural qualities. Whereas a large proportion of Europeans can be developed to the

level of leadership and responsibility, so far as we know at present the number of natives of similar potentialities is few. One of Dame Nature's laws, however, is that demand creates the supply. Hyder Ali and Nadir Shah came from the crowd. However, for practical purposes, the fact remains that the leaders of Asiatics must be Europeans or their equivalent in prestige and position for the objects of the British in India. The Native Officer, as we know him, must remain an under-officer. This enables us to deal with the subject under two distinct headings, *viz.*, the "Under-Officer" and "The wider scope."

A.—THE UNDER-OFFICER.

Scope and Standard of Efficiency.

It being accepted that the European Officer is, for the most part, essential to the leading of the Asiatic, the position of the Native Officer as an under-officer follows as the natural sequel. He is required as a company and troop leader and nothing more, except so far as casualties may require him, for the time being, to lead a squadron or double company. Careful promotion and the improved methods of training are evolving from the ranks and the direct commission men, native officers who are suited to lead under modern requirements, and to train their men to the point demanded of them. It is improbable that any greater efficiency will be required of the under-officer in the future than that now required of him. (That is to say, of company officers and troops' leaders.) Where the instruction is good and the material well selected, we are getting excellent results, and shall get better every year. So far as the efficiency of the under-officer is concerned, for his under-officer's duties, there is no better training than that of the regiment, and it is admitted that we cannot better the material. It is further probable that we should be unwise to get a better class for this work alone, for then the duties to be performed might be distasteful.

The Duke of Connaught was always credited with a desire to form a military college for Native Officers. So long, however, as the under-officer class alone is under consideration, the training in the regiment even for direct commission men gives the better result. The man promoted from the ranks is a suitable man for the purpose required, and is, as a rule, well rewarded by the honours and emoluments within his reach. The direct commission man is usually as suitable as the ranker, sometimes more so, but also sometimes less so. The prospect of a commission is one of the great attractions that draws the better class of yemen to the ranks. The present number of normal direct commissions (one in three in the cavalry, and one in four in the infantry, with exceptions in certain corps) does undoubtedly detract from the prospects of the rank and file, and must be one of the contributory causes of the constant outflow of young soldiers, that is now so prevalent.

A career higher than that opened to an ordinary native officer is not necessary to attract men to the ranks. Plenty of men come

forward for both class of commissions. In the case, however, of the direct commission men who touch the limit of their prospects early in their career, there is no doubt that relief is required for special cases; it may be as limited as may be desired, but it must exist, otherwise it would be wiser to cease giving direct commissions at all.

The giving of direct commissions was the inception of a liberal policy, in the hope of providing a suitable career for the higher classes. The idea at its inception, no doubt, had in view also the possible advancement beyond the usual grades. If it had, this has been undeveloped. It has, no doubt, had the effect intended to some degree, but it is generally believed that the class tapped is not very much better than that obtained through the ranks. The decline of the prestige of the soldier's position, due to the long eras of absence of danger, has reduced the value of the direct commission, while no doubt, also, the better men (as has been already shown) feel keenly, or are ready to feel keenly whenever the agitator suggests it, that they are unduly cribbed and confined in their scope.

If we choose, for political reasons, to say that any enlargement of the military career of the native soldier is impossible, that would be perfectly intelligible and would no doubt be founded on well weighed counsels. If we do so, however, we should be consistent and revert to the old policy of promotion from the ranks only, and maintain the native officer's position for the convenience of Government and the suitable promotion of deserving soldiers of the yeoman class. Such a course would be logical in every way. We shall, in that case, be well advised to do away with a class in whose breast we have no right to rouse any hope that we have no intention of fulfilling.

It is not, however, to be imagined that there are many of the direct commission class of immense parts, but there are certainly some. The only amelioration for this class is either higher military prospects or else some special prospects in some other service of Government devised with the two-fold object of economical employment and the removal from military life of those who are specially capable, whom we desire to reward, but refuse to admit to military preferment. Such a course would have the demerit of removing a man just because he was a first class soldier, and has some resemblance to the Bengal Army policy that Herbert Edwardes derided.

So far as the under-officer, the term used to denote the native officer as we know him, is concerned, it would appear that there is no higher scope in his own sphere. He must either be tied down to his own role and the strain on the safety-valve removed, or else be translated to another sphere. The question of wider scope or more preferably a wider sphere in the army or elsewhere will be discussed in the following chapter.

B.—THE WIDER SCOPE.

The wider sphere should be considered with reference to two different classes *viz.*, the upper classes of the fighting races, and the under-officers of the army. The employment of the gentry of India

depends on what answer we are prepared to give to two questions: first, do we ever contemplate giving natives of India any share in the higher ranks of the army; and secondly, if we do, is the time for it arrived or within measurable distance?

India and her Share in the Army.

Now it is beyond dispute that rightly or wrongly, the share of the people of India in the army, is entirely a subordinate one. In the earlier days of our rule, there was a greater scope in the irregular services, as has been referred to. Free lances with a following found power and military position under the Company. The march of administration and the advent of the *Pax Britannica* changed all that many a year since. To what stage, however, the share of the native of India in military preferment might have attained had it not been for the Mutiny, it is idle to speculate on. The Mutiny changed the whole phase of our relations to the army for at least half a century. The Civil Services of India, the Medical Service, the Bench, and the Engineering Services all allow natives of conspicuous ability, or who are prepared to acquire specified qualifications, to attain the position and emoluments of the English servants of Government. In the army alone is this barred. That it is barred is amply accounted for up to date by the principles of organisation that governed the re-construction after the debacle of 1857. The question is not whether we have been justified in the past, but to what extent we are wise to continue this policy in the future. It may be admitted that in military employment the personal relations are a matter of the first importance. One man may order another to certain death in the ordinary execution of his duty. The explicit obedience and subordination that officers owe to their superiors puts them on a different inter-relation to that existing between employes of the officer grade in the non-military services of Government. In civil life, the relations of a senior to a junior consist in the exacting and fulfilling of efficient professional service. In military life, the relations have to be far closer, and the exacting of the last stage of professional service, the willing death, all combine to make the native a difficult feature in the grades held by the officer.

On the other hand, let us reflect on the result of the British occupation of India, on the military and gentle classes, those classes for whose rights and feelings Henry Lawrence had ever such concern in the Punjab and Oudh, but whom his brother to some extent could only regard as the drones in the land. The pursuit of the gentry of the country has always been that of arms, and while the individual rights of ownership in property of the land of the gentry have no doubt been respected, still not one single opportunity has been offered them of following in their natural vocation, that of military service. The old noble may sit in his tower and look out on the enrichment and prosperity of merchant and peasant, and reflect that his son has no career or prosperity offered him. He may enjoy

that which he has got, he may spend it in riotous living, he may acquire many women, but whatever he does he becomes under British auspices a degenerate and a lounge. And why? Because he has only one vocation possible, that of military service. Without some such career he must degenerate, and the old chief, knowing what his forbears have been, and what he himself has been, can only curse to see what his son is growing into. The circumstances of India debar the gentry from taking much share in the civil administration. The education required to compete with the codes and routine of an effective Civil Service are not easily found by the Sirdar class. The trader and banker and the Brahmin alone have the nimble brain, so that opportunities that among European people would suffice, here in India give no relief. By force of circumstances, always affected by the memory of 1857, English rule does nothing for the gentry alone. That this is so has no doubt been unavoidable, but is it always to be so? In the Native States matters are different, for though the purifying effect of war and military service only exists in a small degree, still the gentry there belong to a society that *contains the ruling class*; while sport is more readily obtainable, with its effect almost as healthy as military service. Such is the situation that Sir Henry Lawrence saw more clearly than most men. That it was so, the history of 1857 clearly shows where many a chief and squireen joined the rebels for love of life and something doing, and hatred of the life to which they stood condemned. When we first conquered and annexed territories, *more Asiatic*, the conquered gladly accepted any sort of service, thankful only for the crumbs; and this fact with the higher position that service in Irregular and Silladar Cavalry in those days offered, did for a generation or so offer some service. But for the last fifty years and more, the families whose sons hacked their way to power, have had no share in the military service of the Empire, and no chance to rise, be they never so successful, beyond the subordinate grades. Listen to the "Old Pindari," and you may see the situation for weal or for woe in a nutshell:—

"Well, I may be old and foolish, for I've seventy years well told,

"And the Franks have ruled me forty, so my heart and my hands got cold;

"Good boys, they are my grandsons, but I know they'll never be men,

"Such as I was at five and twenty, when the sword was king of the pen."

The fact is here stated, and whether or no it has been, or should have been, avoidable is another matter, but it brings us back with force to the question we are considering, namely, the prospect and status of the native officer of the future.

Political Dangers.

Among the many arguments that are urged against any higher employment of natives in the army, is the element of danger that may be introduced. Indian officers of sahib's grade might have

immense opportunities of conspiracy and be able to take a position never yet possible for them, if moved to disloyalty. Against this it must be urged that the whole of the water-tight compartment policy has been abandoned as out of date. We have deliberately intermingled all the old separate Presidential Armies since railways have removed old local barriers, and we trust, should the old trouble bid fair to arise, on class regiments, and on the fact that small-arm ammunition for modern rifles does not grow from the ground. We trust on the European artillery, the rail and the telegraph, the Suez Canal, the bee-line from Australia, and perhaps most of all, on our good friend malaria. But we really trust on the fact that good government will always make us preferable to the anarchy which must ensue on the disappearance of the English. It is often said that we hold India by the sword, but there is no more misleading aphorism. We do not hold it by the sword, but purely and simply because of the goodwill of the people, and that goodwill is due to two facts, and here the sword comes in, *i.e.*, that we are the men of sword who hold our own and can therefore ensure peaceful existence, and because our doings are just and consistent. In his "Expansion of England," Sir John Seely dwells very clearly on this point. During the Mutiny we never wanted for supplies, for transport, or for an ample equipage of servants and followers. To understand how we rule this country by the goodwill of the inhabitants, let us imagine a national feeling of hatred to the English to uprise. A feeling that it was wicked and unpatriotic to serve us and supply us. Where should we be, if without the least rising or Mutiny, the whole community that now serves the English in a thousand ways were to fall away, unwilling to have any connection with us? Imagine the day when the servants, the sweepers, the bhicties, the cooks, the engine-drivers, the signalmen, the railway porters, the saises, *et hoc genus omne*, quietly ask for their discharge or desert. The sword would be of little avail; 75,000 Europeans, or ten times that number, could make no way in the country at all. It is abundantly clear that we do not hold India by the sword, but by the goodwill of the people insured to us so long as we are "strong men armed." Those protective military precautions that we take are merely to ensure us against a rising on the part of some small faction or section. That being so, the arguments based on the dangers of sharing more with the people of India, in such employment as they are fit for, falls to the ground.

There has, moreover, been a feeling that to train natives of India as leaders of men, is a foolish thing. The unthinking often say this with reference to the Imperial Service Troops. They are entirely on wrong premises. The native of India is often a splendid leader of men. Indian history is full of instances. But he has never yet made a second-in-command, wherein lies his weakness and our strength, which brings us back again to the true meaning of the great Duke's remark about the Playing Fields of Eton. He referred to the habit of loyal support the English games teach.

The Suitability of Natives of India as Officers.

It has often been urged that natives of India are not fit to be put on an equal position with British officers. This is true enough of the major portion of those encountered. The ordinary military officer would hold this opinion very strongly after his experience of natives met with. But then of all others the majority of army officers see the least of the upper class of native. To anyone who has been in a Native State, and who has experience of Imperial Service Troops, the mind will at once turn to a man here and there who emphatically stands out as one fitted for high position, who has all the instincts and capacity of a soldier, and in whom responsibility in the case of the troops has developed power and authority. They are, it is true, few and far between, but that is as it should be, and they certainly do exist. That there are men to be found fit to live in every-day intercourse with British officers, a day in the Officers' Mess of the Sirdar Resselah at Jodhpur will show. Any of those who know Sir Partab Singh of Idar, know that he is of a type under whom Englishmen in the due course of promotion might well be content to serve. Many of Colonel Sir Aslam Khan's friends will readily admit that he is also of the stamp to be welcomed among the commissioned ranks of the army. All who have some acquaintance with the gentry class of India will remember men fitted for the election that is being discussed. In this question it must be understood that the most rigorous selection would be maintained, entirely at the pleasure of Government, and there is no question of rights or tests to be passed. Nomination was good enough for British officers for a hundred years and more, and it must be good enough for any natives of India.

Practical Difficulties.

The real difficulties in the way of employing natives in higher grades is not one of policy and political danger, but the far more powerful one of sentiment and precedent. In the army the native has always been a subordinate, and the very possibility of one here and there being on equal footings, and perhaps senior, is not tolerable at all to the imagination of the Englishman. In the civil branches of Government employ, Englishmen have not only to meet natives holding a position of equality, but have definitely to serve under them as their departmental superiors. The position is not, therefore, intrinsically impossible. Cricketers have not been ashamed to serve under a native's captaincy, while in Native States many British officers of all branches of Government service serve the Durbars as State servants.

This difficulty, however, is none the less for being partly sentimental. The best way of overcoming it is worthy of careful study.

The difficulty, however, is not so great as might be imagined. In the Egyptian army, there are, or were till recently, four battalions entirely officered by Egyptians. The Kaimakam or Lieutenant-Colonel commanding was a Lieutenant-Colonel proper and was senior to any British Bimbashes (majors) in the army.

Wider Sphere in the Army.

There are two ways of employing natives of India as officers, one is to treat them exactly as any other officer, with the same prospects of promotion, the other to employ them only as staff or departmental officers. The first of these would mean their appointment among the British officers of an Indian corps, in which the difficulty is that of instituting such a system. The corollary is that the officers so posted would have to be thrice selected; the problem to be faced is "to what extent are such officers to be allowed to advance," the answer to this is "to such extent as their personality entitles them." How to inaugurate such a method of employ, requires much consideration, and the best method would seem to be the appointing of one or two undoubtedly suitable men to regiments in which it had been ascertained that the Commanding Officer would himself insist on the experiment being made a success. With the careful selection that is essential, we should find that by the time an officer became sufficiently senior for his first promotion, his position would have been recognised as a matter of course. We should, of course, have to preserve the fullest powers of refusing promotion.

The alternative to an ordinary career in the army is one in Staff or Departmental employ. A very little reflection shows the impracticability of such a course. It is the one which has been temporarily adopted with officers commissioned from the Imperial Cadet Corps, and it is one that shows no way out of the trouble. There are only two sorts of staff or unattached employment possible, and these are the personal staff and the Intelligence Department. The personal staff provides employment no doubt, for a few years, of the kind for which young native gentlemen are well suited, but it provides no career and gives no definite training. It is an excellent way of employing and educating some young chief, who is to be called later to his own State, either as a ruler or to the military employ of his own State, but not for any other purpose. Again, the Intelligence Branch of the Chief of Staff's Division has no outlet for young officers. Except for one or two very special services of a secret nature, the employment is merely as assistants in a compiling and editing bureau. This employment is excellent as a preliminary education to a man, whose higher training is to be commenced at the Staff College, but it cannot provide any career. The future of officers recently commissioned from the Imperial Cadet Corps is a matter of much perplexity. The only way of employing officers on the unattached list, is in appointments which only postpone the question of their rank and future, and which do not solve one single part of the problem. So long as we confine our direct commissions as officers to gentlemen whose ultimate career is to be in a Native State, and whom we are therefore only educating by means of a commission in a junior grade, the unattached employment is a useful means of avoiding a difficult question, but it has in reality nothing to do with the solution of the problem we are studying. There would, therefore, seem to be only one principle on which

this question can be developed, if it is to be developed, *viz.*, that of a full officer's position commencing at any rate with the ordinary regimental appointment.

Palliatives.

Though however, this may be accepted, there are possible palliatives which may soften some of the difficulties, and at any rate cover the period in which we are experimenting with the question, and educating Englishmen's minds to understanding and accepting the position. One of these that has often been suggested is the existence by formation or gradual conversion of corps in which the grades are almost all filled by natives with the rank and position of the British officer, but in those corps only. It is one of those cases when the economic value of the corps on the basis of pounds, shillings, and pence might give way to the possible political and expedient advantage. Such a corps could easily be formed, and there would be no need to form it at once. Officers first commissioned would only be transferred to such a corps on promotion, let us say to captain's rank. British officers of junior rank need not be posted to it. We thus provide full position without the difficulty of seniority in the corps. A corps such as this might be a convenient stepping stone to a state when natives might take their place among other officers, or would be a convenient place in which an experiment that proved a failure could be ended. A question still to be solved, however, would be that of rank outside their own corps. Would a native gentleman holding a commission in a special corps take rank and command in the army, or could it be avoided? He could of course easily be made junior of his rank without hardship, but not junior to other ranks. Rank that only extended to the corps, hardly seems possible, for this would at once raise the question of the position of British officers, who might find themselves in a mixed force which included a portion of a corps of this sort.

At the same time, as has already been referred to, in the Egyptian army, though special corps commanded by Egyptians exist, those Egyptian officers have the same rank as the British officers, and though kept in special corps, yet have the full rights of their rank among them. Against the formation of a special corps, which would not be formed till many years had passed and officers trained and passed through the lower grades, may be argued the position of the corps while forming, and the difficult position of those junior British officers who were in it during its early years. It is probable that the most satisfactory way would be to post natives to corps in turn, with perhaps never more than one in each corps, so that one corps should not be different from another. The number to be appointed would be so few, that it would be many years before there was one in every regiment. This system would accustom men's minds to accepting the situation far sooner than that of having special corps.

Qualifications for Appointment.

It has been stated in this essay, that if there was to be any further advancement than now for the present native officer, it should not be because of his rank in the under-officer's grades, but because in that grade he had developed valuable characteristics far in advance of his fellows, and had for that reason been given a *pukku* commission, exactly as duly qualified men from elsewhere received *pukku* commissions. There should be no question of any sequence of promotion; special qualifications as an under-officer might as a special case be given a full commission. This, without making the under-officer's grade the road to the full commission, would put a ladder to the now unscalable wall that cribs the most successful of the under-officers. It has already been argued that to make the under-officer's grades the necessary stepping-stone would defeat the object by keeping the better class away.

We have in the Imperial Cadet College the necessary machinery for training men for full commissions. It alone should be the recognised road, and then only at the pleasure of Government. The special circumstances would be the full commission to the under-officer of extraordinary merit. It should be within the power of Government to bring, if occasionally desirable, the under-officer into the service at something higher than the lowest rank. A man under certain circumstances might, for instance, come in as a captain, specially if his age was such that advancement to a very high grade would be impossible. It would be for consideration whether any special training of the under-officer would be necessary. If it were, something in the nature of a senior course at the Imperial Cadet College or some similar institution might be desirable. The Cavalry School would possibly answer this purpose for the cavalry.

It could not be too clearly laid down that appointment to a full commission was always by the prerogative of Government and rested on no claims, while the most rigid selection was exercised. In this connection the institution of some very special reserved clause is essential, such as that the candidate other than a specially selected under-officer should have been educated at a Chief's college, or some similar qualification of the nature of a fine mesh sieve. This keeps the Bengali and the baniah at arm's length.

Employment outside the Army.

There remains to consider as a palliative to the desire for higher prospects the possibility of employment in military or departmental military spheres. This would be merely as an excuse to avoid offering higher military prospects, or at any rate as a method for offering a wider non-military career to the capable under-officer. It has the merit, if feasible, of finding some work for the under-officer badly blocked at an early age. On the other hand, it removes a good man from the army. It is but a palliative to ward off the more difficult question.

The rôles open are not many. Deserving officers of a certain class might be employed in the higher grades of the Remount Department, but it is to be doubted if many are fit for other than the subordinate grades. It would be an economical arrangement for Government, but would not contribute to the problem of military employment in a higher sphere. The same may be said of the Cantonment Magistrate's Department. Such men as would be suited would not be the leaders of men. It would only provide a more lucrative side walk for a class that is probably better paid off with a grant of land.

In the frontier political work there is some scope. In war time and in the days of newly-acquired territory and shirt-sleeve government there was always an opportunity. Such opportunity has been taken too in the past, as in the case of the Nawab Abdulla, Honorary Native Commandant and ex-Native Officer of the 15th Mooltanis, and several of his kin. As, however, frontier political work becomes more bureaucratic, which is inevitable for all governments that begin in shirt-sleeves, the man trained in procedure becomes more and more indispensable. The Political Department have their own Tahsildars and subordinates to advance, and are probably employing as many of ex-Native officers as they can well take. The name applies with more force to civil employment in the more established provinces. Even if a recognised desire to employ ex-Native officers was felt, it would die out and be a constant source of difficulty.

The more the problem is pondered over, the harder does it seem to find any wider scope for the Native Officer outside the army that would be of any real use. It is very much like the question of providing employment for the ex-soldier under Government that is always cropping up at home. It sounds so excellent, but is so little workable when definite attempts are made. It may in fact be said that any attempts to provide snug billets for deserving Native Officers does not fulfil the needs of the situation. Such posts as could be found, are not required as an incentive to men to enlist, and are not likely to increase the supply of suitable candidates for direct commissions.

PART IV.—RECAPITULATION.

So many points have been discussed, that it would be well to review them briefly before concluding. They are much as follows:—

1. The Native Officer to-day is little more than an under-officer.
2. Asiatics require British officers for the most part to fight at the top of their form. The Native Officer, as we now know him, must therefore be, as a rule, little more than an under-officer.
3. The present Native Officers are of two classes, those promoted from the ranks, and those receiving direct commissions. The latter are usually rather better educated, and also are often of better family and connection, though not necessarily so.

4. The present class are equal to the standard of efficiency now required, or will be so when the present system of training is a little older.
5. No higher attainments are ever likely to be necessary to fill the same position.
6. The present position and emoluments with honours that a Native Officer can attain are ample for all but exceptional cases, for the class that win their way up through the ranks. Such is not the case with the more capable of the direct commission men, who find themselves up against an impassable barrier to ambition in the prime of life.
7. The system of direct commissions, whatever its advantages, certainly minimises the attraction of the ranks, for whom the number of commissions is reduced.
8. The responsible position of the Native Officer, so great in the earlier days of the Company, and revived with the irregular system of the post-mutiny period, is impeded by the gradual increase of the number of British Officers however necessary that increase may have been for other reasons.
9. Some steps are necessary to give an occasional opening to the most superior of the Native Officers. They are sure to demand it before long, as part of the general trend of thought in India.
10. Rightly or wrongly, our large army is entirely separate from the gentry and nobility of India. We have done nothing by the offer of military service to keep the best blood from deteriorating. Other Government services are open to the native of India but not the army.
11. The problem, raised by giving unattached commissions to cadets from the Imperial Cadet Corps of their gradual advancement in the army, has not been solved. Definite expectations have been aroused.
12. There is no way of giving commissions except as regular commissions, giving full army and regimental position and seniority in small numbers and with very careful selection.
13. The difficulty of doing this is largely sentimental. We have the example of the Egyptian army before us. In other walks of life, in the world of sport, and in various Government services, it has been overcome.
14. The political danger may be disregarded in view of our present policy in the preservation of India.
15. Natives of India are to be found fit for the position in character, birth, and bearing.
16. There are no other practical methods either of giving military service to the higher classes or of promoting Native Officers than by full introduction to the status of a British Officer.

17. It may be possible to follow the example of the Egyptian Army, and provide special corps to be fully commanded by natives with the status of British Officers, or with only British Commandants, but this does not do away with the relation of such Native and other British Officers. It might be a convenient way of first starting the occasional commissioning of natives of India.

PART V.—CONCLUSIONS.

If the points resumed in the foregoing recapitulation be assented to, it should not be difficult to construct some definite policy for the control of the Native Officer question in the future. It is undoubtedly imperative that whatever policy we are now following, should be re-examined, and if need be altered in view of the progressive trend that is overtaking all other walks of life in India. We have to decide between a conservative and a progressive policy. If we keep to the latter, we should be sure that we have weighed the results and be prepared to stick to them. Which is the path of wisdom none but the wisest can decide.

The following are the conclusions that follow from what has been discussed in this essay:—

1. The present system of mingling direct commissions with promotion from the ranks gives us what we want in the material for under-officers' grades, but raises or will soon raise expectations or ambitions that need fulfilling or ending.
2. There are two main policies to be followed. If we take the conservative one then the following points stand out:—
 - (a) That the promotions should all come from the ranks, thus relegating the ranks of the under-officers entirely to the soldier class for whom the present prospects are sufficient.
 - (b) The Imperial Cadet Corps has produced a situation that needs facing, and it must in future be maintained as an educational establishment for young princes or for those destined for higher military employment in Imperial Service Troops.
3. If, however, we adopt a progressive policy and aim at lifting slightly the barrier between East and West and admitting the best of the Indian fighting races to an Army career, then the following would seem to be clear:—
 - (a) There is only one way to do it, and that is, to commission them on an equality with British Officers.
 - (b) The difficulty to be faced will not be that of finding a few suitable men, but of overcoming the prejudices against it that will be instinctive in even those officers who recognize the inevitability of the course and its possibility.

- (c) That appointments to full commissions (as distinct from those to under-officers' grade) must be entirely at the arbitrary discretion of Government. From the Imperial Cadet Corps as a rule for young men, and from the rank of under-officers in the case of suitable men, entirely as an arbitrary act of grace on the part of Government and in no way in the ordinary course of an under-officer's career.
- (d) It would be an open question as to whether the policy be adopted of providing or converting special corps which would eventually receive the Indian Officer as they get up in rank, as in the Egyptian Army, or whether Indian officers be treated exactly as other officers. The former course simplifies any social difficulty, but, on the other hand, tends to specialise the position of Indians, which in itself would only be admissible as a counsel of expediency for the time being, and would, in reality, accentuate the question of army rank. By absorbing Indians in very small numbers in the Indian army generally, this question would probably automatically solve itself.
- (e) The policy of our safety does not rest on the admission to citizenship and equality of a few of our subjects. The safety of our rule rests on the confidence of the people in our keeping the peace for them and between them with a strong hand, and on governing them well and wisely. A few Indian officers more or less do not materially affect the workings of the volcano on which we sit. Their presence may help to contain it. The arrangement of a departmental career for Native Officers of the present type holds out little prospects of success. Such appointments would be few, and would demand qualities and training other than those necessarily acquired by a good officer. They could only be regarded as a form of retiring reward, and not as the goal of a good soldier. Such as could be conveniently and suitably filled by ex-Native Officers might be kept for them, but would do nothing in the direction of providing a higher sphere for the finer and more ambitious under-officer, or of drawing into the army some of the best blood in India. Measures of this kind, however, might assist to postpone a settlement of the question for a few years.

The foregoing would seem to sum up the brief outline of the subject as it appears to the writer. The extraordinary history and adventures of the British in India falsify to some extent all laws and arguments. Policy, expediency, and 'let the next generation take thought for itself,' may be the wiser policy. To discriminate,

needs a greater than Solomon. Never perhaps in all the history of the British has the hand of a great statesman been more needed. As the Romans occupied Britain, so do we occupy India. They finally admitted their subjects to full military position and ruled in Britain some centuries longer than we have ruled in India. They lost Britain, not because of their policy but because they had to evacuate the country owing to troubles nearer home.

UNITED SERVICE INSTITUTION OF INDIA GOLD
MEDAL ESSAYS, 1909.

Extracts from the Essays of Captain Mark Synge, Supply and Transport Corps, and Major A. B. Dew, I.A., Political Officer, Gilgit.

BY CAPTAIN MARK SYNGE.

MOTTO: *Caveat Emptor.*

.....We must remember first of all that the Native Army does not exist for the Native Officer but the Native Officer for the Native Army, and that however good a Native Officer may be in himself, yet if his qualities are attained by a process detrimental to the Native Army as a whole, he is to that extent an unsatisfactory means to the end for which he exists. Now the abolition or diminution of promotion from the ranks would strike a severe blow at the ordinary sepoy's prospects. Its effect upon recruiting would be very grave. The moral support afforded to Napoleon's soldier by the potential Field Marshal's baton in his knapsack was a very real support. How much more real then is the very tangible chance that every sowar and sepoy possesses of becoming a Native Officer under a system of promotion through the ranks! It is one of the advantages offered to the recruit which could hardly be replaced by increase of pay.

.....It is essential to keep our Native Army contented, and if we deliberately train our Native Officers to think more highly of themselves and to chafe under a subordinate position, we have no course open to us except to satisfy their new ambitions.

.....If Native Officers are given substantially greater powers, they must share them on equal terms with, at any rate, the junior British Officers of their regiment. This being so, they must be placed in precisely the same grade as the junior British Officers, which must result in individual Native Officers being sometimes actually senior to individual British Officers.

.....Even if we suppose that we could learn to treat the anglicised native in India exactly as we treat one another and that he would not revert to native ideals conflicting with our own, he would yet be doomed to failure as a Native Officer, for the simple reason that it would be not *quid* Native Officer, but *quid* naturalised Englishman that we would give him his appointment. It is of the very essence of a Native Officer that he should be in touch with the other native

ranks. His position and his extreme utility are—to use an illustration from a society with which most of us at one time have been familiar—analogous to those of the prefect in the public school. He is the leader of the subject element, partially admitted to the counsels of the ruling element, and helping the latter as a subordinate ruler, yet identifying himself mainly with the ruled rather than with the ruler, and for that reason better able to give true advice concerning those ruled. The anglicised Native Officer would fulfil none of these functions. He would either revert, like the central figure in Mason's "Broken Road," with vindictive celerity to the ideals of his childhood and become the leader in regimental intrigue, or he would remain an ostracised native and at the same time a semi-ostracised semi-European. To discuss him further seems unnecessary.....

..... The Asiatic is as brave as we are, and has fewer nerves. But no Native Officer can have the same moral advantage as the British Officer in leading native troops. For on the one hand the consciousness of representing the ruling race inspires the British Officer in such supreme moments more than the native substitute could ever be inspired, while on the other the native rank and file when fighting for the Sirkar will let themselves be led further by a white man than by any fellow subject of their own colour and kindred. For the white officer by his very colour represents the "Sirkar" and is indeed the Sirkar personified.

..... We cannot do better than heed the words spoken by John Lawrence. "The army in India," he said, "must always be largely composed of natives. It should not be our object merely to make it a powerful machine formidable to our outside enemies. We should in the first instance aim at making it a thoroughly safe one." These words are as applicable to-day as when they were spoken. The power of a modern army may consist largely in the scientific military skill of its officers, and we may be tempted on that account to be impatient with the somewhat slow intellect and primitive tactical knowledge of our half-educated yeoman Native Officers. But we must remember that the safety of our machine is to be our chief consideration since the Indian soldier serving an alien ruler is really a mercenary. We have seen that this safety consists firstly in drawing our native army from this yeoman class; secondly in preserving their simple zeal and loyalty by rewarding the deserving with commissions rather than by pampering all of them with high pay; thirdly in utilising their pride as small but respectable landholders to support their dignity as Native Officers, while at the same time using their simplicity to give them in the ranks the training most suited to their disposition and stamp of intellect; lastly, in forbearing to risk impairing these advantages by any ambitious scheme of higher training that would set the whole machinery out of gear.

Let us therefore decide, provided the political conditions of the country permit us, to preserve the *status quo* in order that our machine

may remain a safe one. Even so we need not despair of adding to our machine the power that comes from greater military skill.

.....We have decided that we do not wish to improve our Native Officer, or at any rate that if we are wise enough not to set up too high an ideal of what the alien officer in a mercenary army of subject aliens should be, we can neither develop the raw material we now use more highly than at present, nor select a more satisfactory material.

.....The retired or semi-retired or extra-regimental Native Officer would make an excellent recruiting officer. He would come to his home full of glory and dignity, and not unblessed with this world's goods. We probably even now owe a large proportion of our recruits to the presence in the neighbourhood of their homes of some retired Native Officer, who has been treated specially well by the Sirkar and is proud of stating the fact. Why then not make it his business to go about proclaiming the fact that the Sirkar has treated him well and will treat others likewise?

The details of this scheme are as follows:—

Every time a new Subadar-Major is appointed to a regiment it is probable that at least one or two Subadars of almost equal rank or qualifications are disappointed, retire on pension, and go home to die. Instead of sending them home to die, send them home to recruit. Do not say to them "You are not good enough for the post of Subadar-Major." Say rather "We are now appointing three Subadar-Majors. One shall stay with the regiment, two others whose abilities appear to lie in that direction, shall go to their home and serve the Sirkar for so many years as Recruiting Subadar-Majors."

.....The regimental Subadar-Major on leaving the regiment might with advantage be given the British rank of Captain. If he was still employed for another term of years as a recruiting officer, this rank would enhance his value as such. Similarly the officer who had been appointed recruiting Subadar-Major at the time that his comrade was appointed regimental Subadar-Major would be promoted to Captain on the same date as that on which his comrade left regimental employ and also become a Captain.

.....There is yet another way in which Native Officers of this standing might be employed extra-regimentally. They might be employed as Double Company Commanders at reservist's trainings. The objections to giving such authority to Native Officers would not be so great in the case of reservists as in the case of permanent battalions.

BY MAJOR A. B. DEW, I.A., POLITICAL AGENT, GILGIT.

MOTTO: *Virtutis Præmium Honor.*

.....The writer being in Civil employ felt extremely diffident as to whether he should attempt to enter the lists in competition on the subject, but was emboldened to do so on the following grounds, *viz.*, his great attraction for all the excellent qualities of the men of our Indian Army, his deep affection for, and abiding interest in, his old corps, and lastly, feeling sure that though better and more purely military views might be expressed by Military Officers in closer touch with the men, he might by chance be enabled to elucidate some of the difficulties of the subject on the Civil side.....

.....It can hardly be said that our Native Officers are not as a rule a most excellent body of men, for the duties that have up to date been required of them and the supply has apparently always been sufficient to meet the demand, but if higher qualities and more initiative is required, it is doubtful whether the present source will be capable of furnishing the supply, even if availed of in the best possible manner. The mistake would appear to have been in two directions:—

1. Care not sufficiently exercised in the system of selection of Native Officers.

2. When commissions have been given to officers their treatment has not perhaps been in all cases all it might have both when serving and, equally important, as regards the good name of the service, after their retirement.

As regards the first, the writer is aware of several cases in which commission rank has been given to totally unsuitable men, who, whatever their service in the army may have been, were entirely unable to keep up the honour accorded to them when they retired to their homes.

Of such instances which came to knowledge those of a Teli (oil-presser), a Gujar, and a runaway slave may be cited, as showing the class of men wrongly promoted, and these promotions were not made in regiments usually stationed very far from the homes of the men. Doubtless an improper descriptive roll had been furnished on enlistment.

Whatever our Congress friends, who to a man it may be remarked appear totally ignorant of whatever pertains to the army, may say, the Asiatic thinks much of birth and breeding and even a so-called democratic Pathan, like our American cousins, dearly loves a "Lord" otherwise a Khan. At present the Commanding Officer of a Regiment trusts to the man's descriptive roll as forwarded by the Civil Authorities in such matters, but if he knew how these are made out, and the channels they have to go through, before being signed by some overworked Deputy Commissioner, he would perhaps

wish for some check before deciding a question of such moment to so many in his regiment. It would be well if descriptive rolls showed fuller details regarding a man's social position; or at any rate more complete enquiries on this head should be instituted before commission rank was granted.

On no account should a man be loaded with the heavy burden of a rank he is unable to bear with honour to himself and those whom he has to govern. There is no necessity for such mistakes to occur, and it must be remembered that though not frequent, one such case will assuredly "bad-nam" a whole regiment and also cause the service to be looked on with disfavour in the villages around the home of this "ass wearing the lion's skin." The following will show that British Officers are often unaware of what such promotion means to a man when he takes his pension. An Officer Commanding a very well-known frontier corps called on the writer one day accompanied by a splendid type of man, the latter was introduced as an officer with an excellent record of service and thought very highly of in his regiment. The Colonel hoped that the Civil Officer would be enabled to assist the Subedar in his retirement by giving him *izzat*, putting him on *jirgas*, etc. The reply was that if his position in the village warranted it, all honour would be paid to the man. Subsequently when on tour the Assistant Commissioner discovered that this Native Officer was a Gujar without any status at all in the village and totally unfit to associate in *jirgas* with leading Khans and headmen of good family. Many are the letters received by the Civil Officers from friends or from Officers Commanding in Regiments asking them to look after *Resaldar So and So*, *Subedar So and So*, "real good fellows, we are so fond of in the regiment," and with the best intent what is the Civil Officer to do in a case as above, beyond offering the "good fellow" a chair when he calls; the feelings of a whole community cannot be upset for the sake of one man; and is it to be expected the subordinate officials will go out of their way to show honour to a man whose near relatives may be at that moment employed in carrying manure for the *tehsil garden*.

Bacon says "one of the chief reasons for sedition is the advancement of the unworthy"; let us be careful this does not apply to the army. Either our system or the lack of knowledge amongst the British Officers is the cause of the second fault mentioned. Everybody is aware that one of the great catch-words to-day in India is "Treatment," i.e., what treatment is accorded by the British to Indians. Can it be said that our treatment of the native commissioned ranks is all it might be? We must always remember we are dealing with a mercenary army on whom endeavours are sure to be made by the disaffected to sap its loyalty, and on no point should more care be exercised than to see that all honour is accorded to those to whom it is due and who are worthy of it. As long as the wrong class of man is appointed to the commissioned ranks it will always be a great difficulty to arrange that he is given suitable "Izzat" while serving, and harder still when he has retired.....

.....It only seems necessary that the present system which has been well considered and is *known*, should be more thorough and perfect. No radical change is necessary and palliative measures are not only ephemeral, but they only lead to greater complications afterwards and are regarded as exhibitions of weakness. Let us remember that subject races are very prone to criticise and condemn the actions of their rulers, whose mistakes they denounce and whose benefits they accept without gratitude. Therefore "*Festina Lente*" should be our motto.

.....About a year ago the author met one of our senior General Officers and while waiting for the train in a lonely station, the conversation turned on the question of the visits paid to officials by subordinates. The officer contended that it was a waste of time seeing people who simply come to pass the time of day, and that he had let it be thoroughly understood that unless a Native Officer had something definite to speak to him on, he could not grant him an interview; it appeared that this was chiefly on the occasion of the return of Native Officers from furlough, and who had fretted this officer by coming up with their small *dali* to salaam on rejoining for duty. It was acknowledged that the waste of time seemed great in some ways and the tax was heavy on one's leisure, but that the writer had found of inestimable value the practice of always being at home, on certain days and certain hours to see all and whoever might care to call, thereby learning much of the feeling and wishes of the people, and where the shoe pinched. Many a time even when walking round the garden enjoying a friendly smoke (cigarettes are cheap) much has come to light in an outburst of confidence which no amount of thought or enquiry through subordinates would have disclosed. If nothing else, it is common politeness and a recognised custom of the country for subordinates to pay their respects to those in authority. No officer in the Imperial Service Troops returning to duty after an absence would fail to attend the Maharaja's Darbar. With all due respect to the officer referred to, and who is one of our finest soldiers in other respects, it may be distinctly stated that from the Indian point of view, he was absolutely wrong. It was the common mistake of dreaming for a moment that the East can be governed on purely Western models of business and knowledge of the value of time. Still his plan was preferable to that of others who will allow a Native Officer to hang about even for hours round an office, a mess or a private quarter (probably not even a chair or a *chillim* is offered) to give a report, until the Sahib shall see fit or find it convenient to attend to him.

.....Considering the outfit of almost incredible ignorance of the country and the people, with which as a rule the young British Officer starts his service, would it not be possible to arrange for the appointment at Sandhurst of a carefully chosen British Officer, who could lecture to the cadets intended for the Native Army on all

matters relating to the sepoy, his customs and ideas of "Izzat." It would perhaps be too much to expect that Government would make some such similar arrangements for lectures at the Universities for all candidates for the Indian Civil Service. Perhaps this idea might be improved on and methods found by which it would be possible to enlighten British Regiments regarding their comrades in the Indian Army. British Officers who will hold positions of importance in the army in India must learn how to govern Asiatics, and understand that they cannot be treated in the same manner as British soldiers.

.....The usual quarters provided for a Native Officer are in few cases suited to their position; a junior clerk in a civil department is often better housed; surroundings *must* make a difference to a man's idea of his position. There should be a good room in each regiment to be used as a club or library for the Native Officers and to which they can invite their friends. It would be popular and probably rival the Majlis, Sabha, Dharamsala, or common bazaar meeting place, and would make perhaps a better lecture hall than some dull orderly room or bachelors' quarters, and would most certainly give the Native Officers "Izzat" in the eyes of the sepoys.

.....A small matter but one which would appeal greatly to the Native Officers would be if a copy of the regimental history could be translated into the vernacular used by the regiment.

.....Our Civilian Officers should be impressed with the importance of kindness and respect being shown to all soldiers, in whatever manner possible, and to remember that it is on the army that the peace of their districts and peoples in the last resort depends, and that although, as Bacon shrewdly puts it, "generally all warlike people are a little idle and love danger better than travail," the service of the military man may any day be useful even in peace time. Soldiers of any rank will be only too ready to do anything for a District Officer who they know will treat them kindly and give them "Izzat." Civil Officers can also do much in seeing that the old soldier does not suffer from a "jack in office," of the subordinate Revenue official stamp, and who is often of mean birth.

"The insolence of office and the spurns that patient merit of the unworthy takes."

.....The near relations of all Native Officers both serving and on pension should be exempt from all forms of Kar Begar, wherever this institution still remains in force; and though the lambardar of a village may be the representative of civil authority, he should never be allowed to press his power unduly on a retired soldier or his family.

.....Direct commissions would seem to be necessary, but it must be remembered that in appointing young and inexperienced men as

Native Officers, old men are superseded who have been steadily and honestly working on for years through all the grades in the confident hope of enjoying vacancies as they occur ; but if this principle were too freely adopted, it would act as a terrible damper and cause a listless feeling most detrimental to all keenness and ambition. It may, therefore, be suggested that a regular proportion should be laid down and then all would know what to expect ; it hardly becomes a Civilian to offer suggestions on such a purely military matter, but two per regiment would seem to be a sound number, and, until one of these had left, no other direct commission, unless in some exceptional case, should be entertained. The sons of retired officers of distinguished service ought always to be given prior claim in every case, other things being equal.....

... It may be taken as a fact that the Native Officer promoted in the ordinary course from the ranks has not as a rule any higher aspiration than to receive his full pension, if possible get a Bahadari and a grant of land. It is from the direct commission man that ambition and the hope of something beyond these limits may be expected, as he will probably be suffering (may it be said) from a higher education and a larger view of the possibilities of life. The question of a wider career is therefore more limited to this class, that is, we must legislate for the better class of man and not the mediocre.....

.....The points for consideration mentioned in this essay may be summarised as follows:--

- (1) No great radical change necessary, and at the present juncture such will be injudicious ; but improvements to be made in existing systems.
- (2) The appointment of an officer to Sandhurst to lecture to the Cadets intended for India on the history, religion, customs and characteristics of the races from which the Indian Army is recruited.
- (3) A better training of the young British Officer in all points connected with the social life of their men by means of lectures, and if considered requisite by examinations, and the necessity of "Noblesse oblige" in their dealings with Native Officers.
- (4) Civil Officers to do all in their power to keep up the "Izzat" of Native Officers either when on leave at their homes or when pensioners, and to see that their subordinates also follow them in this respect.
- (5) Better accommodation for Native Officers, and a good common room to be used as a club for entertainment of their friends, such as a Pathan Hujra.
- (6) Better arrangements for attendance of Native Officers at Civil Darbars.
- (7) An Officer to be deputed to each recruiting circle to look after pensioners.

- (8) Regimental British Officers to be given facilities and encouraged to travel about in the districts from which their men are recruited.
- (9) Some system for the better preparation of recruit's descriptive rolls—thorough enquiries to be made regarding a man's status in his home, and his antecedents, before he is promoted to commissioned rank.
- (10) Accessibility of all British Officers of whatever rank to visits from Native Officers.
- (11) Preparation of hand-books and pamphlets for each regiment, giving short sketches of history, description of religious views and customs, etc., of the men enlisted.
- (12) Histories of regiments to be prepared in the vernacular.
- (13) The institution of a training college for all candidates for direct commissions to which Native Officers' sons should have the first claim for nomination.
- (14) Carcers in all branches and departments of the army to be opened up for Native Officers and also when and where possible in the various Civil Departments.
- (15) And lastly, but far from least important, every care to be taken on all occasions of the soldier's "Izzat."

NOTES ON AERONAUTICS.

BY CAPT. W. M. ST. G. KIRKE, R.G.A.

(*Member of the Aero Club of the United Kingdom.*)

PART II.

"LIGHTER THAN AIR" MACHINES.

The simplest form of "lighter than air" machine is the Balloon, and it is necessary to understand the main problems involved in its use, before one can follow the way in which they have been partially overcome in the modern airship.

The lifting-power of a gas-bag depends on the difference in weight between the air it displaces, and the gas with which it is filled.

The air is a mixture of 79 per cent. nitrogen, and 21 per cent. oxygen, and the weight of 1 cubic foot at 32° Fahr., and at a pressure of 29.92 inches of mercury, is 0.0807 lbs. The weight of the same amount of hydrogen under the same conditions is 0.0056 lbs. and of coal gas 0.04 lbs.

The upward force acting on 1 cubic foot of hydrogen is therefore 0.0751 lbs., or 100 cubic feet hydrogen will lift 7.51 lbs.

It is important in making comparisons between gases, to do so under the same atmospheric pressure and at the same temperature, and it is just these two factors which introduce most of the difficulties which confront the "lighter than air" machines.

To take the first, viz., *atmospheric pressure*. The atmosphere is computed to be 125 miles high, and, at the earth's surface, the pressure is about 15 lbs. on the square inch. As the balloon rises, however, the density and therefore the weight of air displaced, and consequently the lifting-power, decrease, until the balloon should come to rest at a height where the lifting-power equals the weight lifted.

There is, however, another point to be considered. The balloon was filled with gas, i.e., hydrogen was pumped into it until the internal pressure equalled that of the air. As, however, the balloon rises, the external air pressure decreases, the bag expands owing to the pressure of the hydrogen, which becomes increasingly greater than that of the air, and consequently as it displaces more air, the balloon will continue to rise until, unless stopped, it will burst. To make the envelope strong enough to withstand this internal pressure would add enormously to its weight.

Practically, expansion can of course be stopped by letting out gas. The balloon will then fall, and, as it falls, the bag contracts, its

lifting-power continually decreases, and, unless ballast is thrown out, it may strike the ground with great violence. It will be seen, therefore, that in unskilled hands the balloon will be continually rising and falling, and that considerable knowledge is required to maintain a desired height.

Temperature.

The same results are produced by changes of temperature. Heat causes the gas to expand, and the balloon to rise, whilst cold has just the opposite effects. Here again gas must be expended to counteract the former, and ballast thrown out for the latter.

It will, therefore, be readily understood that the length of a balloon's voyage may be considerably curtailed by the early expenditure of gas and ballast, under atmospheric conditions which cannot be predicted.

Diffusion of Gases.

No known fabric, not even rubber-covered cloths, will prevent the diffusion of the hydrogen into the air, and its replacement by the same quantity of air. The lifting-power of any gas-bag is consequently continually on the decrease.

Rain and Snow.

As may well be imagined the envelope, wet, weighs much more than when dry, and this increase must be counterbalanced by reduction of weight elsewhere. Snow has recently put Parseval III *hors de combat* for the time being, and is always likely to prove a dangerous enemy.

Ballonette.

To save expenditure of ballast and gas in rising and falling, or in counteracting an undesired tendency to do so, a subsidiary bag was introduced inside the gas-bag. This bag, technically called a Ballonette or Compensator, can be filled by a fan from the outer air.

Starting with it filled with air at atmospheric pressure, it is evident that if more air be forced into it, it will become heavier and the balloon will sink, and *vice versa*.

Further, by exhausting the air in the ballonette as the temperature or height increases, the gas may be given room to expand inside the envelope without altering its external shape, or sacrificing gas to prevent it from bursting.

In practice both gas-bag and ballonette have valves which open automatically at different pressures, they being so arranged that the air goes first, all being driven out before there is any loss of gas.

The above system has been explained at some length, as it plays a most important part in the designing of the modern dirigible balloon or airship, more especially of the collapsible and semi-rigid types to which we are now coming. Still a further improvement in this direction has been introduced into the Schütte airship, *vide* page 14.

DIRIGIBLES.

The addition of motor power to a balloon converts it into a dirigible, *i.e.*, one which is capable of steering a course apart from the direction of the wind.

It is obvious that it will be easier to drive certain shaped vessels through the air than others, and, having designed the most favourable form, that it is desirable to keep it unchanged under all conditions.

This may be done in three ways:—

(A) Having the gas-bag made of the proper shape and keeping it always quite full and so distended. (This is called the collapsible type).

(B) Supplementing (1) by rigid ends, or a rigid girder bed under the gas-bag. (Semi-rigid type.)

(C) Having an entirely rigid frame covered with fabric aluminium or wood, quite apart from, and independent of, the lifting gas-bag. (Rigid type.)

(A) The collapsible type is the most portable and consequently the one most suited to the requirements of a field army. It is evident that the efficiency of this type depends on keeping the envelope distended. Any expenditure of gas necessary for descent, if unreplaced, would cause the head of the balloon to cave in and immensely increase the head resistance, or, if the ends were kept full, would cause a sag or kink in the middle, which would be equivalent to driving a tandem with the leader constantly trying to look at the wheeler.

The simplest solution would be to carry more gas, but the weight of the cylinders necessary for this purpose limits the amount which could be conveyed, though possibly the introduction of liquid hydrogen might solve that difficulty. Failing that, the value of the ballonette will be very apparent.

In the collapsible type it serves—

(1) as ballast ;

(2) to maintain the pressure in, and consequently the shape of, the gas-bag ;

(3) in the "Parseval," which has one at each end, to alter balance, raise or lower the ends, and so to rise or fall.

Advantages and disadvantages of collapsible type.

The advantages are :—

(1) Readily made portable.

(2) When deflated perfectly safe from wind-storms, and therefore a shed (hangar) can be dispensed with. On the other hand, to inflate the new Clement Bayard requires 227,500 cubic feet of gas, and one waggon can only carry 10,000 cubic feet. This limits the extent to which deflation can ordinarily, under service conditions, be indulged in.

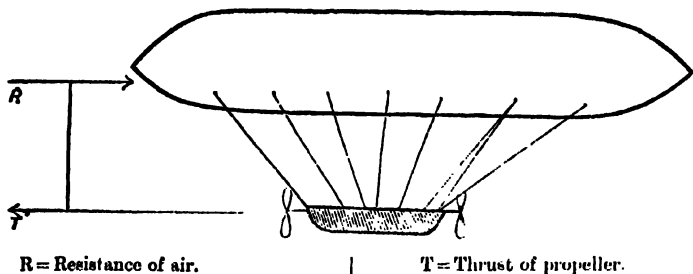
Disadvantages.

1. The question of suspending the car presents difficulties. To prevent the bag sagging in the middle, a long suspension is necessary, *i.e.*, it must be hung from as long a portion of the gas-bag as possible, and in a collapsible, there is nothing much to fix it to. The old system of attachment to a net over the bag increases skin friction enormously. On the other hand, if the car is short and the stays attached to the under side of the balloon, the latter is subjected to compression strains, increasing as the car is raised. A long car, as in the Clement-Bayard (Fig. 3) is, however, cumbersome, whilst the interpolation of a girder, as in the Zodiac type, practically converts it into the semi-rigid variety. All these methods involve hanging the car some way below the bag, with corresponding resistance and loss of speed. Again, since the motive power and steering apparatus are on the car, the latter must be rigidly attached to the gas-bag, and to attach something rigidly to anything which in itself is not rigid is almost impossible.

2. Slight deformations under side wind pressure are apt to take place with consequent oscillation and loss of speed.

3. To get the best results it is important to place the centre of effort of the propellers in the same line, as the centre of the resistance of the airship.

Fig. 2.



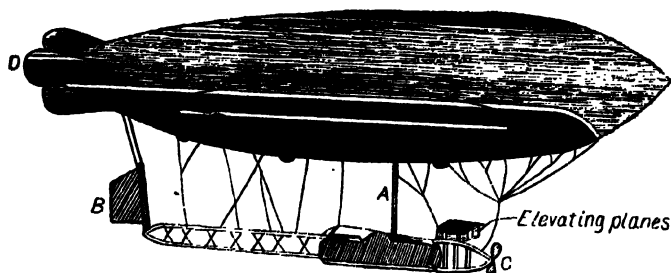
In Fig. 2 it is obvious that the thrust of the propeller and the air resistance form a couple turning the nose of the ship up, which must be counteracted by horizontal planes, the resistance of which tend to reduce speed. The propellers, however, cannot be attached to the gas-bag, and to fix them up high enough, whilst attached to the car, is a problem of very great difficulty.

On the other hand, it is quite easy to fix them to the frame of a rigid ship, in any desired position, as is done in the Zeppelin.

The best known types of collapsibles are the Clement Bayard (French), Parseval (German), Baby (British), Col. Renard (French), Zodiac (French), Ruthenburg (German), and the hybrid Yamada (Japan).

As there is a possibility that, before this is published, Great Britain will possess a Clement Bayard brought over by the Parliamentary Committee, a short description of that type may be of special interest.

Fig 3.



CLEMENT-BAYARD I.

Ballonette, shown dotted

A. Pipe connecting ballonette to air-fan.

B Double rudder.

C. Propeller—in new vessels will be at sides of car.

D. Stabilising gas-bags (4.)
Length, 220 feet.

The sketch given is that of Clement-Bayard I, and No. II, now under construction, differs in some ways. The nose will be blunt and the body long and conical, rather similar to the "Parseval."

The length will be 300 feet, and capacity 227,500 cubic feet, half that of the Zeppelins and one-third that of the Schütte, whilst sufficient petrol will be carried to enable it to sail 700 miles under favourable conditions, and to carry twenty-five men. The motive power will be supplied by two motors of 220 horse-power, each driving a propeller, placed at either side of the car (instead of one at the end). Speed, 30 to 40 miles per hour. Either engine will operate both propellers if required, so that if one engine broke down, the ship could still struggle along, under half-power. The ballonette is in the lower portion of the gas-bag, and runs nearly its full length. A fan driven by the engines maintains the air in it in a state of compression.

In the rear of No. I are smaller gas-bags to maintain longitudinal stability. In No. II, built for England, these will be replaced by a vertical plane under the tail.

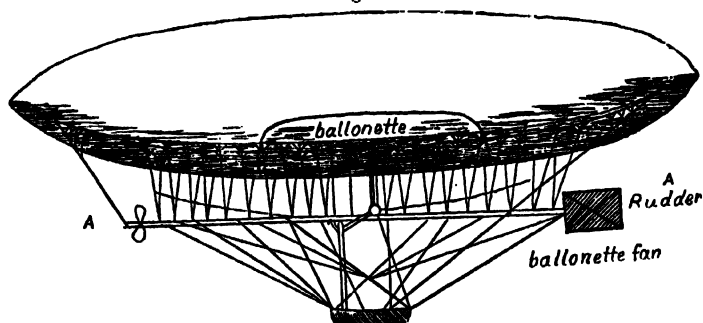
One man steers for direction by means of vertical rudders, whilst another maintains desired elevation by means of the tilting planes in front; when the gas-bag is propelled inclined up, the pressure on the underside raises it without expenditure of ballast, and conversely when tilted down, it descends without expenditure of gas.

This is important, as it enables the ship to be steered up or down at moderate altitudes without that loss of gas and ballast, which circumscribed the radius of action of a balloon. It is a feature of all Dirigibles.

In the sketch, it will be seen that the car has a long suspension, i.e., it is suspended from nearly the whole length of the gas-bag, which, therefore, is free from the tendency to sag in the middle, noticeable in the Lebaudy type. (Photo 10).

In consequence of the disaster to the *Republique*, it is intended to introduce the cellular method of construction into the gas-bag of Clement-Bayard No. II.

Fig. 4.



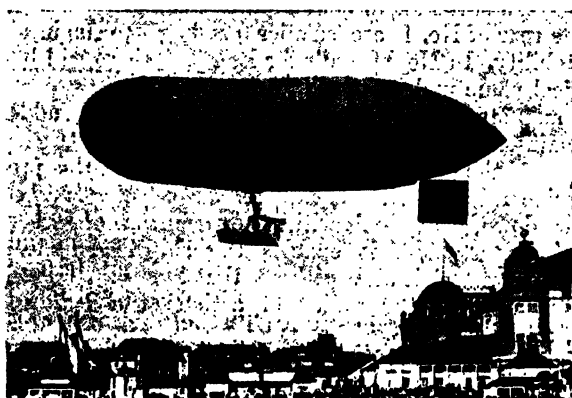
ZODIAC II. (de la Vaux French. —Length, 106 feet. Volume, 1,000 c.m.)
 Note the girder AA' introduced to get a long suspension without compressing
 bottom of balloon. Compare Fig. 9.

THE ZODIACS.

The Zodiacs are small collapsibles, designed to carry one or two men for three hours. The long girder from which the car is suspended can be taken to pieces and the whole rapidly packed into a truck. Primarily Zodiac I. was designed as a cheap ship for pleasure parties (cost £1,000). Its speed is only 17 miles per hour, but it is claimed that the ease with which it can be deflated renders it suitable for short distance reconnaissance with a field army. Zodiacs II and III have been increased in size from 700 c.m. volume to 1,000 c.m. and 1,400 c. m. respectively, with corresponding gain in speed and radius of action, but loss in cheapness and portability.

Fig. 5.

PARSEVAL (German Collapsible),



Note short suspension and consequent sag at A. — (Photo from the "Aero.")

PARSEVAL.

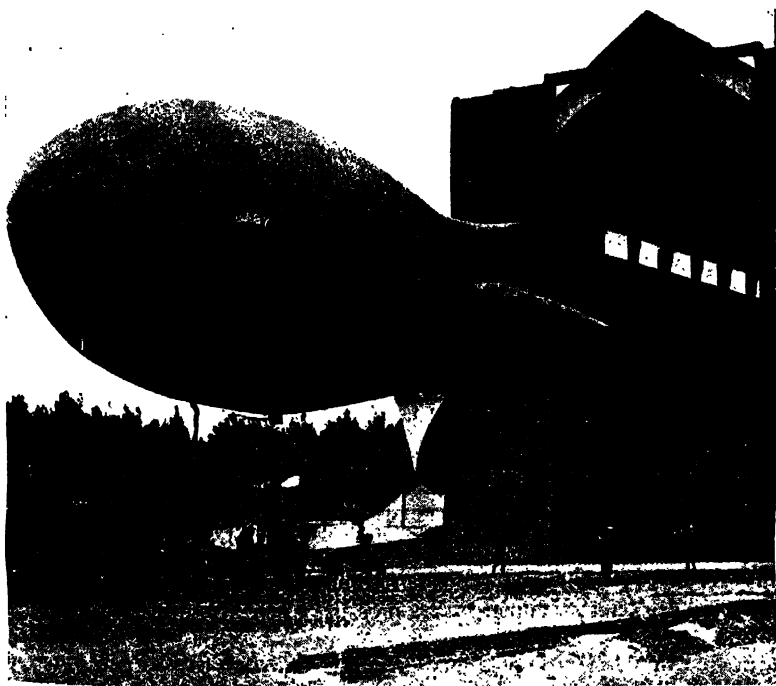
This is the German type of collapsible, of which four have been built and others are projected. Austria selected it in preference to

all others in the market. Its main advantage is its portability, one railway truck or two pair-horse waggons being sufficient. Other features are :—

- (1) The two ballonettes already referred to, one in front and one in rear. By altering the air in one at the expense of the other, the trim can be adjusted.
- (2) The car is capable of swinging horizontally on wires running over rollers, and automatically preserves stability.
- (3) The propeller blades are of limp fabric, which fly out by centrifugal force, and are therefore serviceable and portable.
- (4) The ship can be unpacked from a truck, assembled, and filled in three hours.
- (5) Its speed is about $33\frac{1}{2}$ miles per hour, and it has manoeuvred continuously for $11\frac{1}{2}$ hours.

Fig. 6.

British Army Dirigible "BABY" leaving its shed at Farnboro'.



Photo, from the "Aero."

Fig. 7.

YAMADA Dirigible (Japanese).

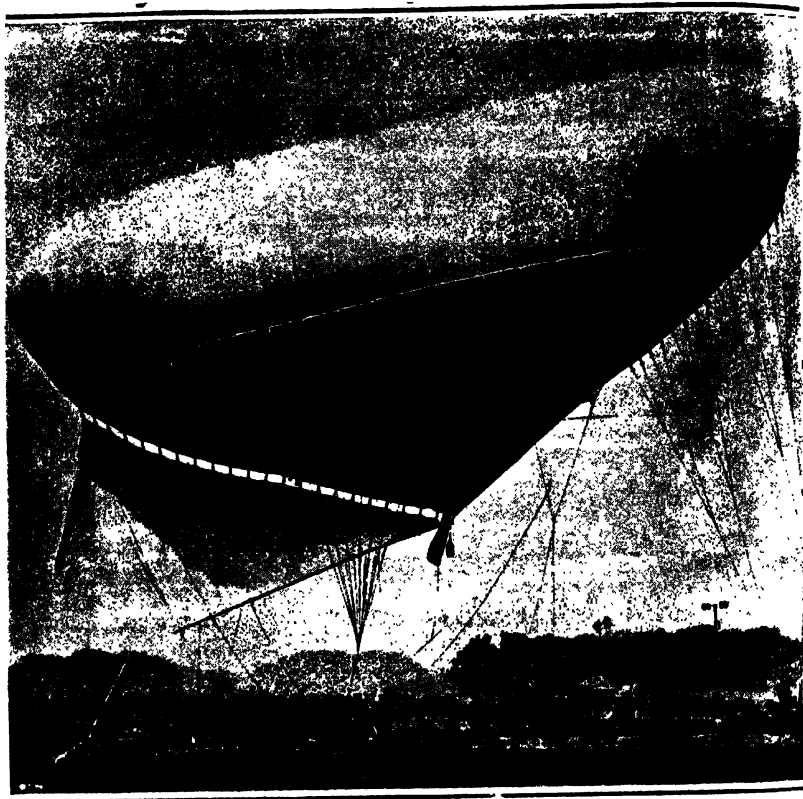


Photo. from the "Aero.

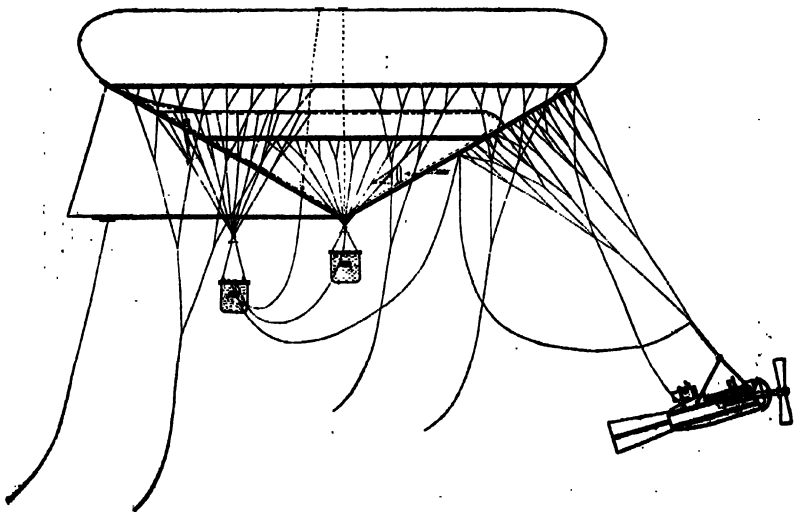
YAMADA (JAPAN).

This dirigible was designed by Mr. Yamada, the constructor of a balloon used at Port Arthur. The nacelle, or cradle, which unfortunately being on the ground, cannot be well seen in the photo, forms a sort of aerial torpedo dragging the aerostat behind it. It is so suspended that in whatever direction the course is laid, the envelope is kept head-on to the wind. The same idea is seen in the Japanese kite balloon (Fig. 8) used at Port Arthur.

The ballonette is open to the pressure of the wind through an opening in front of the main envelope, and has a smaller outlet pipe arranged in a vertical position. Air pressure is thus maintained without a ballonette fan. The Japanese, it may be mentioned, have not yet taken up the question of flight as thoroughly as one might have expected, both the above being hopelessly obsolete.

Fig. 8.

Japanese Kite Balloon, used with success at Port Arthur.



From the "Aero."

RUTHENBURG (Germany).

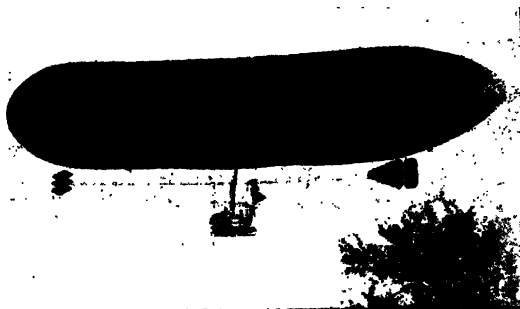


Photo. from the "Aero."

THE RUTHENBURG.

This is a small German airship which, like the Zodiac, might almost be called a semi-rigid. The envelope is kept distended by an air-pocket. The weight of the car is distributed by a tubular steel girder which can be seen in the photo 9. This girder, to which the car is rigidly fixed, is attached by bands to the under side of the envelope. The elevating and steering arrangements can be seen in the photo. and are similar to those of the Clement-Bayard. The propeller is peculiar, the blades being of fabric fastened to the hub at one end, whilst the other two corners are fastened to two parallel

rings, thus giving the necessary twist. During the trials of this airship at the Frankfort Exhibition, she rose to 3,000 feet easily and manœuvred extremely well.

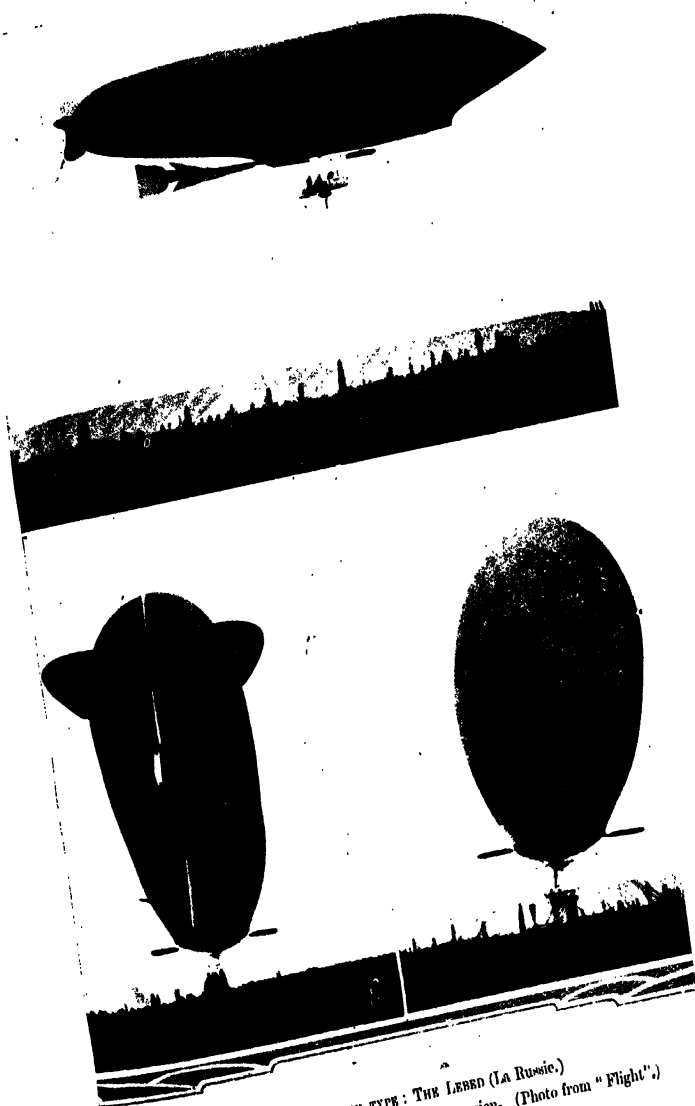
(B)—SEMI-RIGID TYPE.

Under this heading may be included collapsible airships, which are stiffened, so as to approximate when inflated to the rigid type, and which can be taken to pieces and packed up in a reasonable time. At best, they are only a compromise.

The most celebrated are perhaps the Clouth and the Gross (German), the Lebaudy (La Patrie, La Russie, La Liberté, and the ill-fated La Republique), of which one has been ordered by Russia, and one by the "Morning Post" for England, and the Belgique made by Godard (French) for the Belgians.

NOTES ON AERONAUTICS.

Figs. 10, 11 and 12.



LEBAUDY SEMI-RIGID TYPE: THE LEBEED (La Russie.)

Note the sag in the top photo, due to the short suspension. (Photo from "Flight".)

The former is the most interesting for us. The attached photos give a good idea of its general appearance, though the later ones are shorter with a bigger diameter. The result is a considerable increase in cubic content and lifting capacity, which in "La Republique" was 3,700 cubic metres, lifting some 9,000 lbs. of which 2,700 were available for passengers, ballast, fuel, instruments, etc.

As in marine ships the increase in size is necessary for more powerful engines and more fuel with consequent increase in speed and radius of action. The ballonette is about one-fifth the total volume and permits of an ascent to nearly 6,000 feet and a descent to earth without altering the shape of the gas-bag. To descend from a height of one mile, gas will be let out of the gas-bag by the valves and air pumped into the ballonette. On reaching the ground the ballonette would still not be full of air.

The ballonette occupies the lower portion of the gas-bag, and is divided into compartments to prevent the air rolling from end to end as the ship oscillates.

Suspension of Car.

An elliptical-shaped steel frame is attached by toggles to a hemp net fastened permanently to the gas-bag, by means of strong canvas bands. The frame can be quickly removed, by means of the toggles, from the gas-bag.

From the frame, steel cables run down to the car and are arranged in triangles, thus rigidly attaching the car to it.

The whole can be taken to pieces, but to do so more than a day is required.

The frame is only attached to 70 feet of the gas-bag and consequently causes it to sag in the middle. (*Vide* photo. 10.)

By suspending it to a longer portion of the bag, this could be obviated, but it would involve lengthening the frame and so increasing its weight. The frame enables the car to be placed nearer the bag than is possible in the collapsible type.

Stability.

Vertical stability is maintained by the horizontal planes A shown at the rear, and by the two horizontal planes like the feathering of an arrow shown in prolongation of the elliptical frame B. (Fig. 10.)

Horizontal stability is secured by the vertical planes shown behind the elliptical frame and in rear of the gas-bag.

Propeller.

The position of the propellers on the car (Fig. 12), as in the Clement-Bayard, is disadvantageous.

Steering.

Progression up or down is effected by the movement of planes C near the centre of gravity above the car (photos 11 and 12), and loss of gas and ballast is reduced to a minimum in rising and falling, when travelling at speed.

It will be remembered that La Republique was destroyed owing to the fracture of a propeller blade which flew off and ripped up the gas-bag. To obviate any such accident in future, it is proposed to use wooden propellers and cage them in. To minimise the effects of damage to the envelope, it will be divided up into cells connected by passages large enough to equalise pressure throughout, but small enough to ensure a gradual descent to earth in the event of injury to any one of them.

It may be of interest here to reproduce the text of the conditions drawn up by the Advisory Committee of the British National Airship Fund, as they represent the maximum efficiency which can be expected at the present time from airships of the collapsible or semi-rigid type:

1. The balloon to carry a crew of six, together with wireless telegraph apparatus up to 300 lbs. in weight, and petrol and ballast together making up a total weight of not less than one-fourth of the full total lift.

2. The balloon to have two similar engines of equal horsepower, all parts of which are interchangeable. Either engine independently, or both together, to be used at will in working propellers.

3. The ballonette capacity to be one-fourth of the total capacity of the balloon.

4. The balloon to be of the non-rigid or semi-rigid type.

5. The balloon to be portable, that is, to be capable of being taken to pieces easily when deflated, and packed on wagons for land transport.

6. The balloon to have anchor ropes and guiding ropes, and to be capable of being taken in and out of its shed by not more than thirty men in a calm day, that is to say, when the wind is not more than ten miles an hour.

7. The balloon to be capable of anchoring in the open for twenty-four hours in moderate winds up to 20 miles.

8. The stability and steering capability of the balloon must be satisfactory.

9. The balloon envelope not to lose by leakage more than one hundredth part of its capacity for every day of 24 hours.

10. The balloon must be capable of rising to a height of 6,000 feet with its full crew and wireless apparatus, and must have in hand, then, sufficient fuel for three hours' run at full speed, together with one-fifth of the original complement of ballast.

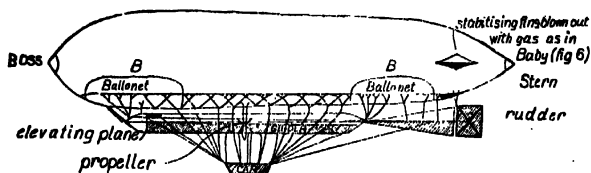
11. The balloon must complete a triangular course of 100 miles each side, that is, a total course of 300 miles, in not more than fourteen hours, travelling fully equipped. For four hours of this journey the

height above the sea-level not to be less than three thousand feet. Any suitable day may be chosen.

12. The speed of the balloon on a measured course of 5 miles with and against the wind (due allowance being made for the velocity of the wind) shall not be less than 32 statute miles per hour.

Fig. 13.

GROSS II. (German Semi-rigid.)



Note the 2 ballonettes, B, B.

Fig. 14.

"CLOUTH" (Small German (Semi-rigid).)

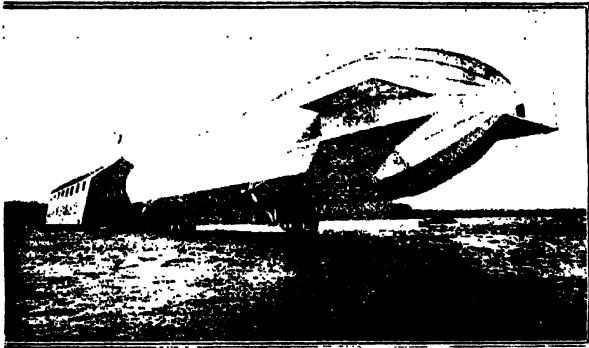


Photo. from the "Aero."

(C)—RIGID TYPE.

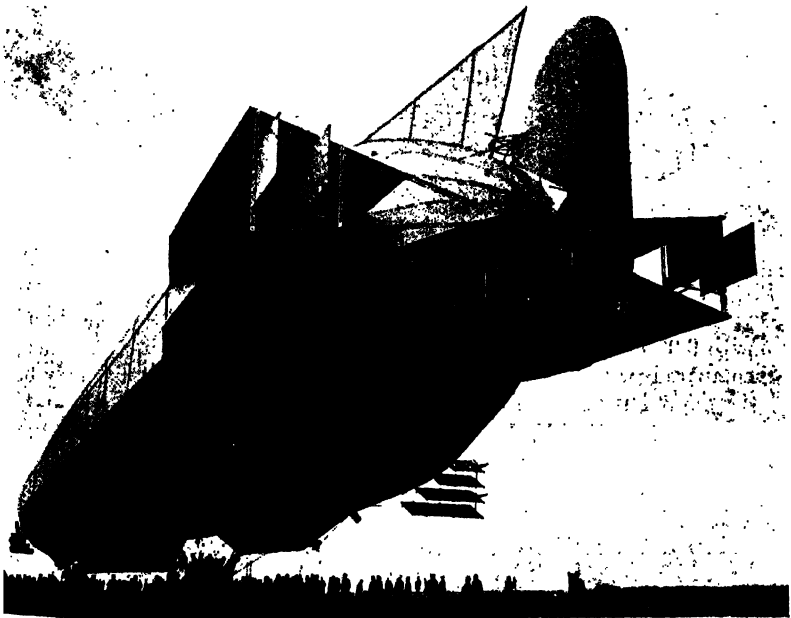
The best known exponent of this type has been Count Zeppelin. Up to date he has built six vessels, all similar in their more important features. Of these, three have been destroyed, and three are now in commission, stationed—one at Metz, one at Cologne, and one at Berlin (instructional). A fourth is being constructed for Government, and others for passenger service.

Fig. 15.



* Zeppelin I. leaving its floating shed on Lake Constance [stern view showing air passages (A) in which are placed the rudders for horizontal steering.] In No. 11 large vertical planes have been added at the stern, *vide* Fig. 16. Photo. from "Flight."

Fig. 16.



A rear view of Zeppelin II, which took part in the manoeuvres at Cologne. This view gives a good idea of the enormous length of the vessel. Photo. from the "Aero."

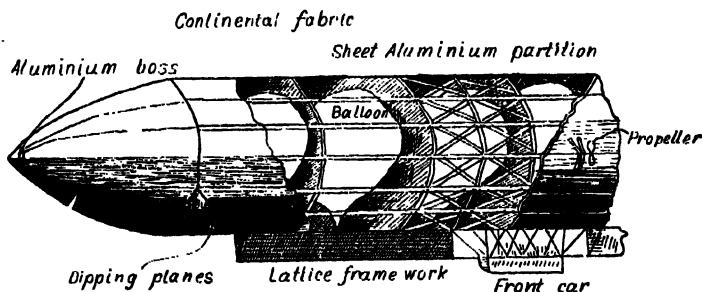
The envelope is rigid and consists of a sixteen-sided aluminium alloy frame work with ogival ends covered with the cotton and rubber fabric made by the Continental Tyre and Rubber Company. The whole is braced every 45 feet, whilst there are seventeen gas-bags contained in its length, each completely separated from the others by partitions of aluminium which tend to stiffen the frame.

The outer envelope takes up all the exterior air pressure, whilst the cushion of air between it and the gas-bags inside reduces the effects of changes of temperature and altitude on the volume of the gas.

The cars (2) are rigidly attached to the frame work of the envelope and close up to it, thus reducing head resistance.

The propellers, four in number, are placed on either side of the envelope on the centre of resistance of the whole, *i.e.*, in the most favourable position possible. An extra pair of propellers has since been added to the latest Zeppelin, placed between and somewhat below the others.

Fig. 17.



Bow portion of Zeppelin showing construction of rigid envelope.

The lifting-power of the gas-bags is about 32,000 lbs., compared with 9,000 for the Lebaudy, the length of frame being 446 feet compared with 200. One-fourth to one-fifth of this lift may be considered as effective for passengers' ballast, etc.

In Zeppelin IV, designed for passenger service, it is hoped to carry forty passengers distributed in three cars.

The planes which elevate and depress the vessel can be seen in Fig. 16, there being four sets on the venetian blind principle. When tilted up at an angle of 15° , at a speed of 35 miles per hour, they increase the lift by 1,700 lbs., so that losses of gas in the front balloons can be counteracted.

This was found very useful in the famous journey of the latest Zeppelin, shown in Fig. 18.

Fig. 18.



Sketch map showing the route of the Zeppelin airship, which started on Saturday evening about 9-10, and travelled as far north as Bitterfeld, where it commenced its return journey, ultimately being damaged at Goppingen, about mid-day Monday, when within a comparatively short distance of its home on Lake Constance.

Whilst in the air it is, therefore, by far the most efficient ship yet produced, and no collapsible could hope to encounter it with any chance of success.

Disadvantages.

Its difficulties, due to the enormous size necessary to sustain the additional weight of the rigid structure, commence when it tries to get to earth. This is a difficult enough operation under the most favourable circumstances, and since it can only maintain its position in a strong wind under propulsion, it must eventually come down when fuel is exhausted. However favourable the conditions may be when it ascends, they may have changed for the worse when the time comes to descend. Even supposing the descent to have been satisfactorily accomplished, there remains the enormous envelope, and unless this is placed in a shed, the first storm will either tear it from its moorings as happened to the Zeppelin I, or will severely strain the structure. Docks are a necessity, therefore, and this

Even though the front two gas-bags were torn, and one motor disabled by a difference of opinion with a tree, the airship managed to get back from Goppingen to Friederichshaven under its own power. In the flight referred to, Zeppelin travelled a distance variously estimated from 650 to 940 miles without a stop in 37 hours 55 minutes. It has since done 240 miles at a speed through the wind averaging 30 miles per hour.

Advantages of Zeppelin Rigid type.

The advantages of this type will have been understood from what has gone before and need only be summarised here.

(1) Obviation of expansion and contraction of gas due to temperature or height.

(2) An envelope which maintains its shape, whatever happens to the gas-bags.

(3) Propellers placed in most advantageous position.

(4) Reduction in resistance of car.

(5) Greater speed consequent on the above.

absolutely debars a ship of this type from being any practical use with a field army operating away from home territory.

Germany is also building two Schütte dirigibles. Great secrecy is observed with regard to these ships, but they are said to be fish-shaped, and, with a length equal to that of the Zeppelin's, to have a cubic content of 19,000 c.m. against 13,000 c.m. Wood is used instead of aluminium, and in consequence the hull, in spite of its increased size, is 3 tons lighter than that of the Zeppelin.

Another distinctive feature is an arrangement by which two bags when at sea level are nearly empty, but as the ship rises and the gas expands in the others, these two take the overflow and fill at about 6,500 feet. To descend, these two are again exhausted into the remainder. This method combines the advantages of the air balloonette without its loss of lifting-power. The German Government does not propose to build any more Zeppellins, preferring this far superior type, from which it is hoped to obtain a speed of 50 to 55 miles per hour.

Great Britain is also building a rigid dirigible at Barrow-on-Furness for the navy, popularly supposed to be an enlarged Zeppelin, length 510 feet, and it is hoped to attain a speed of 45 miles per hour.

In addition to the above, the "Scare" ship may be remembered. Dr. Boyd claims to be the author of the mysterious appearances in various parts of the country of a strange airship. It is believed that he has a fairly large rigid dirigible, but the greatest secrecy is maintained as to its exact nature and whereabouts.

FUTURE OF DIRIGIBLES.

The one great objection to "lighter than air" machines is the size of the gas-bag necessary, and this is one which only the discovery of a new gas considerably lighter than hydrogen could materially decrease. To raise a certain weight, a certain amount of gas is required, and this weight is absolutely fixed by the number of men, amount of fuel, and apparatus necessary.

No doubt increased lightness in the construction of the hull will enable more powerful engines to be carried by the same sized envelope, whilst improvements in the shape and position of cars and propellers will increase the latter's efficiency per horse-power. Similarly, the invention of a perfect gas-holding substance would improve the vessel's "airworthy" capabilities.

As regards aerial motors, the most successful vary from 3 lbs. to 6½ lbs. per horse-power. It is true that a substantial decrease in weight to Sir Hiram Maxim's ideal of 1½ lbs. per horse-power would increase speed, but in practice any great advance in this direction, by solving most of the difficulties connected with heavier-than-air machines, would put any but the most powerful dirigibles completely out of court at anything under 3,000 to 4,000 feet.

Under present conditions it may be assumed that to effect any great improvement in speed and range, increase of volume will be

necessary, and that, as in the water, the size of the aerial Dreadnought will only be limited by docking facilities. To revert, however, to the military aspect of the question.

A gas-bag is of course infinitely more affected by wind-storms than any ship that sails on the sea. Taking the accepted definitions of a hurricane at from 57 to 90 miles per hour, a gale from 34 to 57, a strong wind from 24 to 34, and a fresh wind at from 15 to 24, improvements in construction and engines might possibly raise the speed to 60 miles per hour, and so enable an airship to hold its own in a gale by steering dead into it. It would certainly however, be driven far out of its course should it try to steer across it, and if its fuel were exhausted before the gale blew itself out, would be unable to land with any chance of success, seeing that no satisfactory anchor has yet been invented. Under no imaginable circumstances could it weather a hurricane in the open, whilst the transport of the portable sheds now being designed on the continent would be a terrible handicap. Without the use of these latter, however, it may be assumed that no vessel of moderate size suited to military work, whose suspension is due to a gas-bag, is likely to be evolved which will have perfect freedom of action in anything more than a strong wind. To attempt to manœuvre in a gale would be to trust very largely to good luck.

At the same time, in countries where meteoric conditions are more or less constant for long periods, a vessel of doubtful efficiency in a variable climate, like that of England, might be of great value.

Assuming for the moment that some form of airship is an indispensable adjunct to a modern army, the choice is apparently limited to two kinds:—

- (a) A large ship with a comparatively high speed such as an improved Parseval, Gross, Clement-Bayard, or Lebaudy, with the concomitant disadvantage, that it must either act between fixed bases or have a portable shed, to which it must usually return.
- (b) A small ship of an improved Zodiac type, speed about 30 miles per hour for from 5 to 10 hours, which must be accompanied by a supply of liquid hydrogen, and used only under favourable meteoric conditions.

Put shortly, one may say (a) less trouble to carry a shed than refills of gas, (b) *vice versa*.

MILITARY VALUE OF DIRIGIBLES.

Here it is not proposed to discuss the value of airships for naval purposes, attack and defence of harbours, commerce destruction, etc., suffice it to say, that they have now reached a stage where no power can afford to neglect this question, more particularly one like ourselves whose existence largely depends on the mobility which bases confer on fleets.

What we are immediately concerned with is their value for military purposes, and this has been practically demonstrated in last year's French and German manœuvres.

The Republique got above the attacking force in a mist, and when the latter cleared away, carried back full and accurate notes of its enemies' dispositions.

The Gross, after being ruled out of action for having approached within rifle range, was subsequently restored, and it is claimed that the success of its side was largely due to its observations.

However much the absence of opposing airships may be deemed to detract from these performances in continental eyes, the facts appear to justify careful consideration by military authorities in India.

EMPLOYMENT GENERALLY.

It is generally admitted that "military" airships will not be used for offensive purposes, except possibly against each other, for a variety of reasons, amongst which one may give:—

- (a) The number accompanying a field army must be small.
- (b) Their value as scouts is so great that loss could not be risked.
- (c) There is nothing with a field army of paramount importance which can be destroyed by one or two well placed bombs, and not many can be carried.
- (d) To place a bomb well, the ship must descend within rifle or close artillery range.

It is therefore to the service of reconnaissance that one must look for their *raison d'être*.

EMPLOYMENT IN INDIA.

With regard to their use on the Indian Frontier, the mountainous character of the country is much against them. To make any close observation of the enemies' forces, it would be necessary to sail low enough to be able to look right into the bottoms of the valleys, and to do so would be to bring the ship within rifle range of the hilltops and, what is still more dangerous, of the violent air currents which at certain times of the day sweep down them. Further, it must be remembered that in the case of all flying machines their power to rise is only relative to sea level, and that an airship designed to lift to 4,000 feet, would, at Quetta for instance, remain helplessly on terra firma—this would hardly appear worth mentioning but that it was actually forgotten, in the case of the balloons sent out to South Africa—only in certain parts of the O. R. C. could they do more than bump helplessly along the ground, a fact to which our various abortive attempts to relieve Ladysmith may partly be attributed.

It follows that no ship of a portable size would be of the slightest use on either the North-West or North-East frontiers.

Should, however, a situation occur necessitating operations in the plains of India, the case would be quite otherwise, and airships might be of inestimable value. We might expect interruption, more or less complete, of more vulnerable communications, and still have to maintain touch between forces at a considerable distance from

each other. To be able to maintain communication in the initial stages would deprive the situation of its chief danger. Extent of country affords difficulties only second to those offered by the enemies' armed forces, as we learned in the last Boer War, and in the American War of Independence. The latter presents remarkably analogous conditions to those which we might expect in India, and the vital importance of maintaining communication was clearly shown in the disastrous converging operations ending with Saratoga.

PRESENT EFFICIENCY OF AEROPLANES AND THEIR BEARING ON THE SUBJECT.

There are many who consider that the airship will always have a place in the armaments of the world and that the "heavier than air" machine will never seriously threaten its supremacy. Recent events, however, at first sight hardly bear this out. Paulhan has already risen to 2,000 feet (November 1909), whilst Letham and Le Blon at Blackpool and Doncaster made flights in half a gale (37 miles per hour) with almost as much precision as on a calm day. True, that on either occasion had the motor developed any fault, disaster could hardly have been avoided, but given the skill and a reliable motor the aeroplane as at present constructed can manœuvre in winds nearly equal in speed to its own.

The degree of skill, however, required was shown by the failure of other aviators on either occasion to follow the example set them. It is surely too much to expect of the ordinary military aeroplanist, such as the French propose to introduce in the immediate future.

Until, therefore, some great improvement in motors increases reliability and speed (and consequently height), and individual skill is to a certain extent aided by automatic stabilising devices, the airship seems likely to be the more useful for our purposes.

TYPE OF VESSEL FOR INDIA.

It only remains to consider the type of vessel most suited to our requirements.

In considering the question in the light of European experiences, one is apt to forget how extraordinarily favourable are the conditions in India for every form of aviation.

For the greater portion of the year, constant though gentle prevailing breezes varying to complete calm, little rain and less snow, coupled with enormous stretches of level country, with few trees and ample landing space. How different to England, where almost the only flying grounds are mud-flats and well-bunkered golf courses, and none too many of them.

Another advantage we enjoy is the improbability of running up against a Zeppelin or any other big rigid ship.

We could therefore be content with a vessel of moderate speed, always provided that it had sufficient radius of action.

From the point of view of internal communications, this latter would be the determining factor.

Either one might have a few large ships placed far apart, or by placing the hydrogen depôts at smaller intervals, reduce the size of the ships. The distance apart of the big cantonments in the various provinces would decide this.

For the field armies the smaller class with a radius of 200 to 300 miles would meet all requirements and would not prove a very expensive item if one may judge by the cost of the Zodiacs (£1,000—£2,000).

Though this of course is a matter of opinion, my own, expressed with all diffidence, is that the heavier than air machine, at 1st to 3rd of the price, will eventually supplant the dirigible, but this may not be for a long time to come, perhaps 10 years or more.

Meanwhile the evolution of the latter is little faster than that of the battleship or submarine, from which we may infer that it is nearly as good as it is likely to be within the next decade, and that, as under Indian conditions, it is efficient, there is nothing to be gained by waiting. It is, in fact, now or never.

The conclusion that foreign nations have come to may be gathered from the following table:—

Table showing dirigibles. { A. Completed.
B. Under construction or projected.

	Rigid.		Semi-rigid.		Collapsible.		Total.		Private miscellaneous.		Estimates, 1908-09.
	A	B	A	B	A	B	A	B	A	B	
Austria	1	...	1	...	1	£35,000.
Belgium	1	...	...	2	1	2	1	...	
Great Britain	1	...	1	1	2	1	4	1	...	{ £5,270 for '08-09. £78,000 for '09-10. £20,000 (subscribed). (sub-
France	2	1	2	...	1	1	6	1	{ £47,000.
Germany ...	3	3	3	2	6	3	12	8	1	6	{ £133,000 £250,000 subscribed. +
Italy	1	2	1	2	...	...
Russia	1	...	1	1	2	1	...	1	
Japan	2*	...	2	...	...	...	* Yamada and Flying Car.

CONCLUSION.

This article, in spite of its length, cannot be considered an exhaustive treatise on the subject of "Flight." In dealing with

"lighter than air" ships, one stands on comparatively firm ground, and the two months which must elapse before this sees the light of day are not likely materially to alter present conditions, of which Part II forms a fairly comprehensive, if somewhat dry, summary. This is not the case, however, with regard to "heavier than air" machines, and to those who wish to keep abreast of the times, the best advice one can offer is to read "Flight" and the "Aero." It is to the Editors of these periodicals that I am indebted for most of the photos. illustrating this article.*

* NOTE.—"Flight," 10s. per annum, including postage, from 44, St. Martin's Lane, E. C.

"Aero," 10s. per annum, including postage, from 20, Tudor St., E. C.

HEAVY ARTILLERY—GUN *VERSUS* HOWITZER: A REPLY.

BY MAJOR K. K. KNAPP, R.G.A.

The fact that the article "*Gun versus Howitzer*," published in the *Journal of the United Service Institution of India* for October 1908, was a criticism of an essay, which appeared in the *R. A. Journal* two years ago and was probably read by few of your readers, is my reason for asking for space to reply to Colonel Stone's criticisms.

The subject is one of much importance at the present moment on account of the urgent and fully recognised need of re-arming the heavy batteries in this country, and notwithstanding the trenchant criticism of Colonel Stone, the arguments in favour of adopting a howitzer and not a heavy gun for the heavy artillery in India are particularly strong, now that our field artillery has been re-armed with a modern Q-F. long ranging gun.

It is hardly necessary to reproduce arguments to prove the unsuitability for service in India, or across the frontier, of the 5" (60-pr.) B. L. gun, the cause of which Colonel Stone set himself to champion, as fortunately all idea of adopting that ponderous, though far ranging, equipment in this country has long since been rejected; and any one with a knowledge of Indian conditions of warfare, who has seen the 60-pr. B. L. gun at practice camp or on manœuvres at Home, must recognise the wisdom of this decision.

But Colonel Stone has a good deal to say on the general question of *Gun versus Howitzer*, and the arguments he adduces in favour of adopting a heavy gun and his objections to heavy howitzers invite some comment. The principal claims, on which he and many others base their advocacy of the long ranging heavy gun, are the necessity for shrapnel fire over 7,000 yards, and the advantage of being able to turn to good account opportunities for using enfilade fire up to ranges of 10,000 yards.

If we admit that provision for these is necessary, then undoubtedly a long ranging gun will be required. But the truth of these conclusions is not admitted by any other great military power. There is not one that has not recently adopted a heavy howitzer for re-arming their heavy artillery, and the general opinion appears to be that the extreme difficulty of observation at these distant ranges, and the unlikelihood of suitable terrain being found in most theatres of war, practically preclude the effective development of shrapnel fire beyond 7,000 yards; and that the occasions, when all conditions might be favourable, are likely to be too rare to justify the provision of special equipments for the purpose.

Starting from the same premise, and assuming the accuracy of official range tables, I argued in my original essay that the Field

Artillery having been re-armed with a new Q.-F. gun, which fulfils all reasonable requirements of flat trajectory fire, the best form of equipment for our heavy artillery would be heavy mobile howitzers. For these weapons are more suitable than heavy guns for all other important functions of heavy artillery than long range shrapnel fire, that is, for preparing the way for the infantry attack and for affording support to the field guns in their duel with the hostile artillery. I do not for one moment minimise the great effect of enfilade fire as suggested, but I believe firmly that the Q.-F. field guns with an effective range of over 7,000 yards are sufficient for all likely contingencies in this respect, and that enfilade fire from these Q.-F. guns will be far more efficacious than from heavy guns, on account of their greater rate of fire, and consequent ability to seize to advantage brief opportunities.

In his criticism Colonel Stone refuses to admit the ranging powers and effect claimed for the 18½-pr. Q.-F. gun; but if he is correct, what is to be said for the accuracy of the range table, which shows a remaining velocity of 702 f.s. at a range of 7,500 yards, and what is the meaning of the paragraph on pages 56 and 57 of "Field Artillery Training," which reads "with a velocity of 700 feet seconds at the point of burst the velocity of the bullets 200 yards from the point of burst is about 440 feet seconds. Thus it will be seen that at the extreme range of the 13-pr. and 18-pr. the bullets always have sufficient striking energy up to 200 yards from the point of burst."

That sinking the trail of the field gun to get elevation over 16 degrees will be necessary is correct, but there is no great disadvantage in that at long ranges, and the suggestion that the buffer springs might prove unequal to bear the strain at these higher elevations has no foundation in fact.

With regard to Colonel Stone's objection to a parallel being drawn from other great military powers, and in answer to the reasons he assigns to each nation for their action in adopting heavy howitzers, it is pertinent to ask whether it is likely that in the next Franco-German war, France will repeat her fatal error of 1870, and allow the frontier fortresses to prove the inevitable attraction to her field armies that Metz did in the last war. Did she not learn to some purpose then the bitter lesson that fortresses play a minor rôle in field warfare?

And is it not equally certain that Germany will again concentrate the efforts of her armies on the destruction of the enemy's field army, and refuse to be drawn into siege warfare so long as a hostile army remains in the field? Yet Colonel Stone attributes the choice of howitzers for their heavy field artillery to the necessity for attacking frontier fortresses. The German heavy artillery regulations are quite clear as to the rôle of their heavy artillery. In them, mortar battalions, which are quite distinct units from their heavy field artillery, are stated in so many words to be restricted to siege warfare, while the rôle of heavy field batteries, equipped

with 5·9" howitzers, is said to resemble more closely the action of other arms on the battlefield and to be a valuable support to field artillery. These regulations lay down too that "an intelligent distribution of the tasks of field and heavy artillery, the working together of both in the artillery fight, and the probable crushing combination of their effect against the place of assault are of the greatest importance."

In my opinion the reason why continental powers have adopted howitzers for their heavy artillery is not, as Colonel Stone would have it, because they expect to be involved in fortress warfare, but because they appreciate the growing importance of high angle fire, and see the necessity for having some heavy mobile howitzers to support their field artillery, and because too they recognise the improbability of using ranges over 7,000 yards to any effective purpose on European battlefields.

Colonel Stone finds some difficulty in explaining the action of the Japanese in adopting the heavy howitzer after their experiences in the recent war, and he rather lamely concludes that they have been prevented from adopting the heavy gun owing to remounting difficulties. But can any one believe for a moment that an astute nation like the Japanese would be prevented by the want of heavy draught animals in their own country from adopting a heavy gun instead of a howitzer, if they considered the former necessary. Heavy horses could be obtained by oversea purchase and the establishment of depôts in the same way as in other countries. The action of the Japanese offers, I think, a strong tribute to the efficacy of heavy howitzers.

At any rate, however, one may try and explain their reasons. There is no getting away from the fact that other great military nations have deliberately adopted the heavy howitzer as the result of a careful consideration of the altered conditions of warfare, and our failure to follow suit at Home is neither to be attributed to a better appreciation of modern requirements than they have shown, nor to any difference in the conditions of warfare for which our artillery preparations are made. The real reason is that we were committed to the heavy gun, as a result of the experiences of the South African war, where the inability of the 15-pr. B. L. to engage the longer ranging Boer gun produced a great effect on men's minds; and the reaction will only set in when the great and long ranging capabilities of the Q.-F. field gun are more widely recognised, and when the production of an accurate shooting field howitzer has established the confidence of the personnel of the artillery in the great qualities of these weapons, a feeling which indifferent howitzers, like the 5" B. L. have done so much to destroy.

Fortunately we are not yet committed to a heavy gun in India, and so are able to profit by the recent experience of others and give due weight to altered conditions in determining what manner of equipment will be most suitable for Indian requirements.

By a careful consideration of these we are, I think, forced before all to recognise how important high angle fire has become since the introduction of Q.-F. field guns. These, though possessed of long ranging qualities and great power of destruction, have little searching effect, owing to the flatness of their trajectory of fire, and so are unable to attack troops behind natural or improvised cover; and as the fire of Q.-F. guns against an objective in the open is capable of producing disastrous results, the use of cover has been much increased by the introduction of these equipments. Consequently howitzers are much required to give the field guns their opportunity; for it is only high angle fire with its steep angle of descent that can effectively search behind cover, or reach an enemy who protects himself by field fortification.

The field army in India is at present lamentably deficient of howitzers, and it is the shortage of these high angle fire weapons in this country that provides the strongest argument for re-arming the heavy batteries with heavy howitzers. There are only three batteries of field howitzers in India, and as there are none too many batteries of Q.-F. guns, the want of howitzers can only be provided for by an increase of the field artillery in this country or by re-arming the heavy batteries with a modern heavy howitzer. The latter is an economical way of partially meeting the deficiency, especially as the re-armament of the heavy batteries is an immediate necessity on account of the unsuitability of the present equipment.

Recent experiments at Home give us some data to work upon in determining what conditions a heavy mobile howitzer can be required to fulfil; the ballistic results obtained with the original Coventry 4.5" howitzer equipment (35lb. shell) surprised all who saw the experiments; the trial shooting was accurate beyond expectation even up to a range of 9,000 yards. It is, I think, by a heavier model of this equipment that India will best supply her requirements. Unlike all previous weapons of this nature, the Coventry howitzer has been designed with considerable shot travel, and much more resembles a gun in appearance than a howitzer, which one has hitherto looked upon as necessarily of stunted appearance. It is this extra length of bore, which makes the howitzer such a fine shooting weapon with the full charge at distant ranges.

The weight behind the team of this equipment did not exceed 45 cwt., and it should be possible to manufacture a heavier howitzer on the same lines to fire a 50lb. shell for no greater weight behind the team than $3\frac{1}{2}$ tons, and capable of producing ballistic results equivalent to those of the original 4.5" experimental equipment, which are in my opinion sufficient to answer all reasonable demands; such an equipment would be well suited to our Indian requirements and conditions of warfare.

If the heavy batteries are to retain sufficient mobility, as is essential, 9 cwt. per horse is the outside weight which it is sound to put behind a team of eight heavy artillery horses, and I should prefer to see the total weight kept below 70 cwt. But as recent

experience has shown that equipments have generally to be strengthened as a result of trial, and strengthening means weightening, and as it often proves difficult in manufacture to work down to the actual specification of weight given in a design, I would fix the weight behind the team in the original conditions at 65 cwt., which should prove sufficient in calculation to provide the ballistics required with a 50lb. shell.

The objections of even those who strongly advocate the adoption of a heavy gun, would be practically met by results, as favourable opportunities for the development of shrapnel fire beyond the range of the Q.-F. field gun could be taken advantage of with a weapon capable of firing with great accuracy up to 9,000 yards. Moreover, though it is customary to dilate on the advantage of the great depth of the zone of bullets of a heavy gun shrapnel at long ranges, the advantage is rather theoretical than actual, for the number of bullets in the two shells being equal (i.e., for the same weight of shell) whatever rates the area of ground swept by the bullets of the gun shrapnel bears to that swept by the bullets of the howitzer shrapnel, the density of bullets in the respective areas will be in inverse proportion, and therefore the effective results of the howitzer shrapnel may easily be greater.

With regard to the tactical rôle of heavy artillery, to which Colonel Stone makes some reference, the method of employment advocated at Home is based on the peculiar experiences of the South African war, and would be inapplicable to any other theatre of war than South Africa. A thing which shows this, and lends some force to the arguments of those who prefer the heavy howitzers, is the difficulty, which is invariably experienced on manœuvres at Home and in India, of finding any suitable opportunities for using heavy guns in the manner suggested in the Training Manuals. And it is desirable that these should be adapted to conditions of warfare of a more normal kind than those of the Boer war.

Heavy artillery is essentially a reinforcement for Q. F. field artillery, and it will not be used as long as the field guns prove sufficient to overcome resistance and enable the infantry to push their attack. Any previous use of it would be a waste of powder, and all that is written about heavy batteries being employed in advanced and rear guards for long range shooting, or to search the enemy's position with a view to drawing their fire, and the talk of heavy artillery moving at the head of a column of fighting troops in front of the field artillery, is tactically unsound when dealing with normal conditions of modern warfare.

Under such conditions the tactical employment of heavy artillery with its limited supply of valuable ammunition is likely rather to be—

In attack.—From the time of its arrival in the vicinity of the battlefield, in readiness to assist the field artillery at the critical time and place, when these are determined, either by co-operating in the fight with the hostile artillery, or by shelling the place selected for assault and so preparing the way for the infantry attack.

In defence.—To co-operate, if necessary, with the field batteries in their fight with the hostile artillery during the early stages of the attack; to search ground hidden from view, when used by the enemy for concealment or approach, of which timely information may be obtained by means of kites or balloons; to assist in the counter-attack, when in a position to do so, by turning the full force of its fire against the objective; and finally to engage the hostile artillery in the last stages of the attack, so as to free as much of the Q.-F. field artillery as possible for the important task of shelling the assaulting infantry.

In advance.—The position of the heavy artillery in column would ordinarily be with the main body of the division with which it marches, immediately behind the field artillery, or in rear of such other troops as are likely to be more urgently required.

In retreat.—The heavy artillery would ordinarily be near the rear of the main body, and ready to assist the withdrawal of the rear guard by its long range fire when necessary.

The system, too, of spreading small units of heavy artillery (4 guns to each division) throughout the field army is not sound, but means the frittering away of what should be a powerful reinforcement of the field artillery, if used in mass at the critical time and place. In no other army has the divisional system been applied to the heavy artillery, and our distribution of the artillery at Home has drawn strong adverse criticism from the continent. One official document, which approves of the principle of distributing much of the field artillery to divisions, speaks of our wholesale distribution as "renouncing all the grand effect of artillery, which has never been more effective than when acting in great masses."

To get the greatest value out of heavy artillery it should undoubtedly be retained in the hands of the army commander, being allotted in the quantity of a brigade of three batteries to each army of two or three divisions. And here in India, where our arrangements for war on a large scale are drawn up on the probability of a double line of advance, a brigade of three batteries in the hands of the army commander of each line of advance would be the best distribution for an effective use of our heavy artillery. The nearer the frontier these batteries can be maintained the better: a brigade at Campbellpore and a brigade at Quetta or Hyderabad Sind would be a suitable peace distribution, and these localities provide good ground for training and practice within easy reach.

The necessity for our heavy artillery to be able to move some distance at a trot in emergency needs little emphasis. The order in "Field Artillery Training" to the effect that heavy artillery always moves at a walk may apply to the 5½ ton 60-pr. B. L. equipment, but it is wrong to lay it down as a principle, and it is quite opposed to continental ideas, where both the regulations and arrangements show recognition of the necessity for greater mobility.

Fortunately in India common sense prevails in this matter, and equipments are not too heavy to be manœuvred as field

batteries; not only has their mobility with over 3 tons behind the team of eight horses been the subject of much remark, but it has not led, as Colonel Stone predicts, to the batteries becoming bad field artillery. Rather may it be said that results have shown that the more these batteries are trained to consider themselves field batteries, and judged by field artillery standards, the greater will their efficiency become, and if a permanent brigade organisation were extended to these units, as to field artillery, many of the disadvantages, under which these batteries at present labour, would be removed.

In conclusion, though it may be difficult to decide without further experience of modern warfare, whether the greater merit lies with the gun or howitzer as the equipment for our heavy artillery, the serious deficiency of high angle fire equipments, which at present exists in India, is a very strong factor in favour of a heavy howitzer being adopted for our heavy batteries in this country, and the inefficiency of our existing heavy artillery equipments urgently demands an early decision on this question of armament.

June 1909.

RAILWAY CONCENTRATION.

Two Lectures delivered at Simla on 21st July 1909.

BY CAPTAIN CHARTERIS, CHIEF OF STAFF'S DIVISION, ARMY HEADQUARTERS, AND MAJOR CAMERON, SPECIAL DUTY MOBILISATION, RAILWAY BOARD.

Brigadier-General H. Mullaly, C. B., C.S.I., who took the Chair introduced the Lecturers as follows:—

LADIES AND GENTLEMEN,—The lectures which we are going to listen to this afternoon deal with a subject which, at first sight, may possibly appear to be of comparatively little interest to the majority of soldiers, as being somewhat technical and a matter which may be thought only to concern specialists. I say “at first sight”; for, if we reflect for a moment, we must see that such is not the case. We all know the necessity of transport in military operations—for, indeed, no war can be conducted without it; and, when the great advantage of railways for land transportation in peace time is so universally recognised, it is obvious that their value for the conveyance of the vast masses of men and animals and supplies that have to be collected together and maintained in time of war, is of even greater importance from the military standpoint. In making the best use of railways we are simply utilising the resources of modern science, and substituting an immeasurably superior form of transport for the old methods on which our predecessors had solely to rely.

Every one of us knows of the startling results achieved by the Germans in the Franco-German War, which, although it occurred very nearly forty years ago, still stands out as an object lesson of rapid mobilisation and concentration. But I think that, in most cases the study of those operations is rather confined to the more fascinating grand combinations and battles, than to the less absorbing details of the great strategic concentration by means of which the fate of the campaign was sealed almost before a shot was fired, and which Captain Charteris will tell us about. We all know, also, of the lessons that we are supposed to have learnt in South Africa, and more recently from the events in Manchuria. The great moral they all teach is that the first essential condition for the successful conduct of war is careful preparation in time of peace. So it is in the case of railways and railway concentration. Not only does a wise nation construct, in peace time, such strategic lines as are necessary for its security, but in making our preparations, it is of equal importance that we should take the greatest advantage of our available lines by means of carefully pre-arranged plans.

Captain Charteris and Major Cameron, who have so very kindly consented to deal with this difficult subject, will now explain to us the means by which this important object can be attained.

Lecture by Captain Charteris.

NECESSITY OF PEACE PREPARATION.—REQUIREMENTS OF GOOD CONCENTRATION SCHEME.—SPECIAL FACTORS IN INDIA.—SOLUTION OF PROBLEM ARRIVED AT IN INDIA.—GUIDING PRINCIPLES OF A SCHEME FOR A CONCENTRATION STAFF.—SUMMARY.

To all who have studied the history of warfare of the past fifty years, it is a truism that railways exert an influence from the moment when hostilities become imminent until the last shot is fired. By means of railways the large numbers of men, animals, and stores are transported rapidly to the base. According as the railway system is good or bad, efficiently or inefficiently worked, the strategic deployment is rapidly or slowly completed. And on the success of this strategic deployment depends in considerable measure the possibility of the initiative with all its attendant advantages. Further, as the war progresses, and one or other side advances, it is by railways that the requirements of the force are met, not merely at the base, but up to the armies themselves.

The lecture to-day has to deal with concentration only, and it is in this initial period of the operations that the influence of railways is most evident.

We know that in the first few days of the war of 1870, the French strategic plan broke down, and that this breakdown was due in part to the failure of their railway arrangements. Men could not find their units; units found no trains at their stations to convey them to the frontier; in certain cases trains with their full complement of troops were entirely lost on the railway.

We know, on the other hand, how the strategy of Moltke both in '66 and '70 was ably served by his railway systems and the arrangements for their military use.

During the war of 1866, the following results were achieved on the Austrian railways:—In nineteen days a single line conveyed 180,000 men, 8,500 horses, and 900 wagons and guns in 427 trains, the average being 11 pairs of trains per day; and in twenty days another line conveyed 200,000 men, 29,000 horses, and 4,500 guns in 458 trains, averaging 23 trains per day. During the war of 1870-71 there was in France no central controlling authority, the result being that officials had to obey conflicting instructions, from all manner of different people, acting without any kind of concert or combination. Not only were the orders contradictory, but they were frequently changed, and often cancelled, whilst in process of execution. Confusion inevitably resulted. Besides this want of a central directing authority, the French in 1870 found themselves involved in difficulties owing to the want of regulations for the transport of troops by rail, and to lack of rolling-stock. There was at the time in France no law which enabled Government to commandeer rolling-stock as required. Any line might refuse troops on the ground that it could not spare the necessary vehicles. On the 15th July, 1870, without any pre-arranged scheme, the railway companies concerned received

orders from the Minister of Public Works to be ready next day to transport large masses of troops. The entraining actually commenced on the evening of the 16th July, but by the 22nd the arrangements had broken down—owing to deficiency of locomotives and drivers—and the entire concentration had to be suspended for several days. As an example of the state of affairs, by the end of August the railway station at Rheims was encumbered by thousands of troops, who had absolutely lost their units and wandered away, and who never rejoined during the whole war. Still, in spite of all these difficulties, the French managed to transport 200,000 men, 30,000 horses, and 4,000 carriages to their north-eastern frontier in fourteen days, a result primarily due to an exceedingly good network of lines.

In the same war the Germans, although their concentration proceeded on a different plan, and was in a large measure successful, were not without difficulties as the war progressed. I would recommend in this connection a German book, entitled "Railways under German Management in 1870-71," by Von Budde. The chief difficulties which the Germans experienced was a lack of rolling-stock, and the fact that various commanders had a method of seizing railway material when required for the movement of their own troops, without reference to the railway staff. "These high-handed measures," says Von Budde, "though they relaxed the pressure at one point, seriously increased it at others, and it frequently happened that the regular train service ordered by the directing authorities was brought to a complete standstill." As the advance into France progressed, the Germans found it necessary to reinforce the existing rolling-stock on one line by hauling engines by hand along roads from lines less seriously pressed.

The Russo-Turkish war of 1877-78 exemplifies the difficulties which inevitably accompany a railway system constructed by civil companies, built as cheaply as possible and without reference to military requirements. The Russian railways were of this nature. They were all single lines, with steep gradients and sharp curves, and suited only for the running of short and light trains. Railway concentration was at the time in the hands of a committee to which officers of the General Staff were attached. This committee had only prepared plans for a general mobilisation. In 1876, when relations with Turkey became strained, and a partial mobilisation seemed probable, the committee received orders to prepare plans for the rail transport of six army corps. The general mobilisation plans proved inapplicable, and had to be revised, and the work was hardly completed when, on the 24th October, 1876, the committee were informed that fresh alterations in the plans had become necessary, and the entire scheme had to be re-written. Concentration itself began on November 17th, and by November 23rd all military traffic had to be stopped, partly because the Odessa railway had run short of engines, and partly because the northern lines were blocked with the engines and trucks required for the southern railways. The Odessa railway could not take over the locomotives

allotted to it, because the fire-boxes were constructed to burn wood, while the Odessa railway used coal. To evolve order out of this chaos, concentration had to be suspended for several days—a striking proof of the necessity of a thorough peace preparation. Even for partial mobilisation still further complication was caused by Army Headquarters itself, which, on account of the cold and the length of the journey, decided to move in special trains at enhanced speed, and caused thereby a further delay of nearly one day in the military time-table.

The Græco-Turkish war of 1897 affords another example of the evils arising from want of peace-time preparation. The army corps transferred from Asia Minor to the base was allotted a line poorly equipped for the transport of this mass of troops, and the entraining station—a mere roadside one—was utterly unfit for the purpose. It had to be rebuilt and enlarged, partly before and partly during concentration. The mobilisation was of 73 battalions only, and the last did not get off until a month after the first had started. Only six trains per diem could be despatched, and these were often two days late. Sometimes for a week at a time 40 trucks a day only were received at the base.

Turning now to the Russo-Japanese war: in 1903 four through military trains only could run on the Trans-Siberia line and three short trains on the Eastern China line. When relations with Japan became strained, the Russians proposed to send out reinforcements consisting of four army corps from European Russia. This required 500 troop trains and a large number of goods trains. The mobilisation of one half of these reinforcements took five months from the declaration of war. This period was utilised to increase the capacity of the lines up to seven troop trains per diem, but, owing to the scarcity of rolling-stock, the actual service was three military trains for troops, one passenger train, one railway service train, and one goods train. Total 6.

In June, 1904, orders were issued for works entailing an expenditure of four million pounds, to bring up the capacity of the line to seven troop trains, one passenger train, and one railway service train. In a full year from the beginning of March, 1904, until the beginning of March, 1905, eight army corps, three rifle brigades, and one reserve corps, or 1,200 troop trains only were sent to the front. In the summer of 1905 the railway was working up to 12 military trains per day. Throughout the whole of the war, Kuropatkin was pressing on the Russian Headquarters the necessity of increasing the power of the railway to utilise 24 trains.

These examples show, I think, the necessity for careful peace-preparation and the danger involved in the lack of it.

The instances I have given are of concentration against civilised enemies, but we have not far to go for similar example in what is now known as a small war. In 1878, at the commencement of the Afghan war, our railway system in India was far from possessing even that measure of suitability for strategic requirements which it

possesses to-day. Time does not admit of a detailed account of the measures taken and the results achieved. They are probably well known to all here.

As an instance of the extent to which Continental powers have developed their concentration arrangements, it may be of interest to know that the German railway lines leading to the Russian frontier are estimated to be capable of delivering 500 troop trains per diem, after and including the fourth day of mobilisation. The menace of this concentration scheme had (according to Kuropatkin) a very direct bearing on the issue of the Russo-Japanese war.

And in the past few months Germany was enabled to deliver what was practically an ultimatum to Russia and to refuse her even time to consult her potential allies—France and England.

Railway concentration is then an integral portion of the conduct of war, and from this we get the first limitation of a good scheme. For it is a truism that strategic plans must constantly alter to meet the varying conditions of the moment; and as railway concentration is, after all, only a handmaiden of strategy, we should be badly serving the interests of the country if we imposed or tried to impose on strategy a hard-and-fast scheme of concentration. Therefore, we deduce, that any scheme which we make can have little, if any, measure of finality. We can foresee to a certain extent alterations which may, in all probability, become necessary, and we can take steps in our scheme to make these alterations with the minimum of dislocation, but beyond this there must be contingencies which cannot be foreseen, and for these contingencies constant revision becomes necessary.

What then are, in broad outlines, the essential features of a good concentration scheme? These, I think, may be given under the following main headings:—

A scheme should have—

1st—Simplicity;

2nd—Rapidity of concentration;

3rd—Flexibility;

4th—Elasticity;

5th—Suitability to the strategical requirements at the base;

6th—(and above all) Practicability.

The advantages of *simplicity* are so evident, that it is unnecessary to labour the point. A scheme dependent for its successful execution upon an unnecessarily large number of factors, in each of which error might arise, courts defeat. For, it is as true of railway concentration as it is of warfare itself, that mistakes once made are not easily rectified; and to avoid these mistakes, we can only have recourse to making the scheme as good as the means at our disposal allow, by splitting up portions of the scheme into such definite blocks as will enable an error to be located and its effects to be limited; above all, by ensuring that an error occurring on a line leading towards any one portion of the theatre of operations will not involve delay or breakdown on lines leading to other portions.

As regards *rapidity of concentration*, its necessity and importance are at once evident. I have referred to concentration being an integral necessity to the attainment of initiative, and this initiative is obtained only when the troops are ready at the position of deployment, in advance of the troops of the enemy. In other words, rapidity of concentration is an important weapon in the hands of the supreme commander. But in this connection I would point out a truism ; namely, that, to assemble troops, and troops only, without their transport and without their supplies, *i.e.*, without the means of making an advance movement, is to defeat and not assist the object of strategy.

As regards *flexibility*, what is meant here is that the scheme should, within limits, be able to adjust itself to altered and varying conditions without being absolutely recast. What I mean is that, if, during the actual execution of the concentration, it becomes necessary, for any reason, either to change the order of the troops' concentration, or to divert troops from one area to another, the alterations involved in the concentration scheme should be of the nature of an addition, and not of an entire recasting.

As regards *elasticity*, what is meant here is that in the scheme as it is executed there should be a certain margin of error, whereby mistakes could be rectified without interference with the general progress of the scheme.

As regards *suitability to the strategical requirements at the base*, this is in a large measure a matter of pre-arrangement. The supreme commander should, subject to such alterations as occur in all warfare, be able to foresee in what direction the first requirements of his troops will lead him. If, for instance, he foresees that a brigade, with some few divisional troops, is sufficient for the protection of the first advance, and of the stocking of advance depôts, then a concentration scheme, which loads up a base prematurely with more troops than these requirements, is a failure.

Last of the requirements of a good scheme which I have enumerated comes *practicability*. This seems almost a platitude, yet it is in this particular that the schemes, to which I referred at the commencement of the lecture as having failed in their object, were most deficient. It is a simple matter to put on paper graphics and timings showing troops and trains moving about the country, without reference to the actual working of the line, to the collection of stock, and to the other integral difficulties of railway management to which Major Cameron will refer ; but it is a very different matter to meet on the one hand the requirements of the military authorities, and at the same time to give to the actual executive railway officials that margin of safety which they rightly require in drawing up their scheme. I would also refer here to the other difficulties which the preparation of a scheme for concentration has to meet. We have, for instance, certain fixed railway lines, and those from certain stations may suit admirably for an advance towards a certain base ; but if we suggest carrying out this movement we may well be met with the objection that we oppose one of the leading desiderata of military requirements,

viz., that the troops in the field should, as far as possible, be led by officers who have trained them, and work alongside the units with which they have been trained.

SPECIAL FACTORS IN INDIA.

I would here point out that in the Empire generally, and in a large measure in India, strategical requirements are influenced by the methods of our Government. In Continental countries, where the very existence of the nation depends upon the successful issue of a war, (and, therefore, in large measure on successful concentration in the initial stages of the war,) the Government have rightly put as their first consideration in the construction of new lines the strategical requirements as defined by the military authorities. The question whether the railway pays or does not pay in peace time is considered of minor importance. Hence they have what are known as strategical railways, whose primary object is military, and the commercial importance of which is little considered. It is easy to see what a useful weapon this is in the hands of an officer drawing up a concentration scheme; but in Great Britain, and in the Empire, this is not so. Railways are regarded as commercial speculations first—their alignment, their station arrangements, their rolling-stock, and their administrations are primarily concerned with the question of revenue against expenditure; and, in consequence, when we begin to work out the details of a railway concentration scheme we find many anomalies causing difficulties in the preparation of the scheme, and delays in its execution.

Yet another difficulty lies in the degree of efficiency of the native railway staff.

Another difficulty which we have to meet in this country is that, until quite recently, the distribution of troops during peace time had little reference to strategical requirements, and certainly none to railway concentration. During the past few years there has, as is well known, been a redistribution scheme of the troops going on. It is unnecessary to refer to this scheme in detail, but a glance at a map showing the present location of units in comparison with those of, say eight years ago, reveals how great our position in this respect has been improved.

What, then, are the deductions from the above considerations? They are, I think, these:—that without a definite pre-arranged concentration scheme to meet the first strategical requirements of a possible war, we shall have a breakdown similar to that of French in 1870 and of ourselves in 1878. But a pre-arranged scheme cannot, and should not, go beyond the first details. If it provides for the concentration of troops and transport sufficient for the first blow in the war, there will, I think, be time and opportunity to supplement the scheme by such measures as may be subsequently required. On the other hand, to tie down our plans to a rigid allotment of all our troops to definite lines beyond the first conflict would, I think, be unsound. We cannot definitely depend on

the troops having to be sent where we may now think they will be required; and to issue a scheme and subsequently cancel it can only tend to confusion and delay.

But a pre-arranged scheme is not in itself sufficient. We must remember that the scheme is, from its very nature, going to be put into execution without any form of rehearsal. One would be very sanguine if one considered that, however carefully a scheme had been drawn up, certain points had not been overlooked. To rectify such errors we must depend on the loyal co-operation of both railway and military authorities to effect the common aim.

SOLUTION OF PROBLEM.

So far I have stated in general terms the requirements and the difficulties of a concentration scheme; I will now outline the solution arrived at in India. In order to co-ordinate military requirements, a meeting between representatives of each was arranged, and the following solution was arrived at, and this solution is the one which at present obtains:—The Army Headquarters prepare in the Mobilisation Branch the requirements of railway transport for war. They submit these requirements to the Railway Board, who in their turn undertake all responsibility for technical details of a concentration scheme. For this purpose the Railway Board place officers at the disposal of Army Headquarters, who, in close communication with the Staff, prepare time-tables for the moves. Samples of plans of movement and concentration time-tables are given in appendices.

As work on the preparation of the schemes progressed under this new arrangement, it became evident that unless concentration requirements were fully considered in the allocation of units to the bases, the railway requirements could not be given full effect to, and the railway administration had to make the best of a bad job in transporting units to the various bases. The advance towards each base was so interlocked with the advance towards another base, that only pre-arranged movements could take place simultaneously. As the scheme progressed, it naturally suggested itself to the officers immediately concerned that if such an allocation of units to the various bases could be made as would ensure a separate trunk railway line leading towards each base being utilised for that base only, and with a network of feeders extended to the various cantonments to bring the troops on to this trunk line, then we should have a scheme fulfilling in general principles the requirements which I have enumerated above. A scheme fulfilling these requirements has been drawn up in outline, as an example. This Major Cameron will explain in more detail. It will be seen that, generally speaking, a unit moving towards a certain base, is kept entirely separate from all lines leading towards the other base.

I have already referred to the necessity of a division of the concentration into blocks, whereby, first, errors are localised and secondly, both elasticity and flexibility are gained. From a military

point of view, it is comparatively easy to obtain definitions of these blocks. It is, for instance, obvious that a block should, as far as possible, contain a definite military portion of troops, such as brigade and divisional troops or transport of some particular form, allotted for some particular purpose; but in working out the details of the scheme it may be found that by certain slight changes and modifications an increase in rapidity of concentration is obtained. If, for instance, in some one block we have troops moving simultaneously from distant and close stations, it is clear the lines cannot be worked at their full pressure throughout the whole period. Again, if we take the case of transport, we find that the transport on which we eventually rely is not all immediately available for concentration. Some units are ready at once, whilst others require some little time for mobilisation. Therefore, in the allotment of troops and transport to blocks, we have to consider both the military and railway requirements.

In addition to these broad considerations, we have further to consider the requirements of the troops themselves during their railway journey. These requirements fall under three broad headings:—first, *entraining*; secondly, *arrangements during the journey*; and, third, *detraining*. As regards entraining, Army Headquarters themselves can do little. It must be in the hands of the local authorities; but in a comprehensive scheme we must have regard to the entraining capabilities of the various stations, and we should arrange that troops are not provided with trains at a greater rate than is practicable for the station facilities, of which the local staffs can best judge. We should arrange, further, that where entraining is heavy, a special staff officer of the railway military concentration staff will be provided to assist the troops and supervise entrainment.

As regards arrangements on the journey, we endeavour, as far as possible, to allow the troops to have one long halt during each 24 hours, in which they can obtain a cooked meal, and a series of small halts when they can supplement this food by supplies carried with them in the train, and by tea. Such stations are known as (a) rest camps, and (b) halt stations. The difference between these two is that at a rest camp, in addition to the facilities for troops actually passing through on their journey, we make arrangements for encamping certain portions of troops to meet the contingency of breakdown on the railway. At halt stations, on the other hand, we undertake no provision for the encampment of troops, but we place such staff and establishment, and such accommodation in tentage, as will afford food and shelter for a proportion of the trains at any one time during their halt. At certain stations we make provisions for a supply of boiling water for the troops to make their own tea.

As regards detraining, we arrange for the necessary sidings, platforms, etc., and, as far as possible, the endeavour is to detrain units with animals by daylight, but it is recognised that where delay is

involved by this principle, detrainment by night is the minor evil. In the detraining stations, we make arrangements for a complete staff to supervise the operations.

It may be asked wherein lies the necessity of a staff other than that of the ordinary railway administration and divisional staff when every detail is considered and pre-arranged. The answer is that the necessity of a concentration staff lies in the fact that, however carefully pre-arrangements are made, minor hitches are certain to occur. These hitches, if not at once rectified, may well develop rapidly, and delay and confusion result.

Finally, in railway concentration, we have two bodies of officials with different duties to consider. If we invest the railway authorities with full authority, military considerations may not receive full weight. If, on the other hand, we give the military authorities supreme control, railway necessities may be overlooked, and consequently impracticable orders given, with consequent delay and confusion, order and counterorder.

Rapid and successful concentration can only be effected by co-operation, and for this co-operation a fully-trained concentration staff is an essential. Even in minor expeditions the necessity of a concentration staff has been again and again exemplified. The Mohmand Expedition of 1908 again brought it to light.

The guiding principles of this concentration staff are :—

- (1) The concentration staff have nothing to do with executive working of the railway, which is entirely vested in the railway administration.
- (2) They are the intermediaries between the military authorities and the railway authorities. Any alteration in the pre-arranged scheme required by either military or railway authorities should be communicated to the other "partner" in the co-operative concern through the concentration staff.

While the concentration staff have, therefore, to a certain extent the double duty of serving both the military and railway interests, their primary duty is to the military authorities and to the troops.

The convenience of troops, in so far as it does not interfere with the working of the pre-arranged scheme, is their first consideration : but nothing short of actual necessity will justify them in permitting any deviation from this pre-arranged scheme.

As it is essential that the concentration staff must be fully cognisant of all the details of the scheme, and in order to avoid hitches owing to conflicting requirements of staff and units, the military concentration staff are necessarily Headquarters staff officers, appointed by, and working under the orders of the Army.

It is clearly the first duty of the concentration staff as of every officer during concentration, to do everything in his power to prevent any avoidable alteration in or dislocation of the pre-arranged plan of movement.

In the event of any hitch threatening to dislocate the concentration, it becomes the duty of the concentration staff to take such steps as are necessary to adjust matters.

As a deduction from above, it is evident that the places where the efforts of the concentration staff are most required, or where they should be primarily concentrated, are:—

- (1) Entraining stations.
- (2) Detraining stations.
- (3) Trans-shipping stations.
- (4) Large junctions.
- (5) Rest camps or halt stations.

It is worthy of note here that any pre-arranged scheme cannot, for obvious reasons, go fully into details of (a) movements of staffs dependent upon the wishes of the General Officer Commanding, and (b) movement of supplies dependent of local markets at the time of the operation.

For these two factors, then, improvising will be necessary, and this is one of the duties of the concentration staff: and it is in this respect that the necessity for a concentration staff has been exemplified in recent minor expeditions.

It will readily be recognised that one of the first requirements for successful concentration is rapid and efficient entrainment, for little margin can be allowed for trains standing at stations pending entrainment, and it is therefore essential that at every station where entrainment takes place there should be a pre-arranged scheme. For this purpose Army Headquarters prepare a list of the trains leaving each station, for issue to the local military staff, who then formulate a scheme for the entrainment on concentration of units leaving that station.

Such a scheme should take note of platform accommodation available at the station, the relative positions of the stations, and the lines of British and Indian troops and transport, and of a camp for troops and transport assembling at a cantonment from stations off the railway line.

The lighting arrangements at the stations, which are primarily under the railway authorities, should be considered as regards their suitability from a military point of view.

“Forming-up places” are necessary, so that troops may be kept in the vicinity, but clear of the railway station, pending arrival of their train. Wherever possible, there should be one such forming-up place for each platform.

The ingress to the station may in many cases require improvement, and this should be pre-arranged.

A system of inter-communication between the “forming-up places” and the stations themselves, whether by orderly, visual signalling, or telephone, is essential.

Further, arrangements have to be made for keeping the vicinity of the station and the station precincts clear of the general public.

Arrangements also have to be made for feeding and watering troops in the station precincts and at the place of assembly.

The sanitary arrangements require provision, and finally an enquiry bureau should be made under military arrangements, and no military officer should be permitted to refer to the railway staff.

SUMMARY.

To summarise, then, the two primary essentials of a successful concentration are first, a pre-arranged scheme, and second, the loyal co-operation of both the railway and military officers affected, and this includes all military officers. It should be remembered that a unit proceeding on war service can hardly expect to travel with all the measure of comfort which is provided in peace-time, but such arrangements should be made that, as far as can be foreseen, no man or animal shall suffer hunger or thirst during the journey. They should be provided with ample accommodation, one cooked meal per day, and with tea in the intervals between halts for cooked meals. Rest-camps, where they can be accommodated in the event of delay in concentration, are required, and finally it should be the primary duties of a concentration staff to consult the comfort of the troops. But with all these provisions, inconvenience and discomfort are bound to occur. Such inconvenience and discomfort we consider are unavoidable, but are minimised and will be willingly borne by units moving to the front.

In the new Field Service Regulations issued by the War Office the essential points of a railway working in war are well summed up.

"A railway system," it is said, "is a highly sensitive machine easily dislocated by unskilled treatment; it is at the same time an organism most vital to the maintenance of an army. Subject therefore to considerations of tactical security, the convenience of troops must be subordinate to the efficient working of the line as a whole."

Lecture by Major H. A. Cameron, R.E.

THE ESSENTIALS OF ANY SCHEME OF RAILWAY CONCENTRATION FROM A RAILWAY POINT OF VIEW.—CONSIDERATIONS AFFECTING THE SELECTION OF THE AUTHORITY TO CONTROL RAILWAYS IN TIME OF WAR.—THE ESSENTIALS FOR THE SUCCESS OF A PRECONCERTED SCHEME OF RAILWAY CONCENTRATION.—RAILWAY METHODS ADOPTED IN DRAWING UP—(a) MOVEMENTS ON A LARGE SCALE; (b) MOVEMENTS ON A MINOR SCALE.—METHOD OF ADVICE TO RAILWAY ADMINISTRATIONS.—GRAPHICS.—SUMMARY.

Captain Charteris has already fully explained what the essentials of any scheme of railway concentration should be from a military point of view, and I now propose to define what may be considered the essentials from a railway point of view. These, roughly speaking, are—

- (a) the scheme must be preconcerted (*i.e.*, previously worked out in time of peace);
- (b) the definite data given by the military authorities must be subject to a minimum of alteration;

(c) a separate line of railway advance to each base (if more than one) should be allotted ; and

(d) ample notice be given when the scheme is proposed to be put in force.

As regards (a), I have heard it stated by certain military, civil, and railway officials that a preconcerted scheme of railway concentration is of no great value, as, due to the strategical requirements varying from time to time, it will never be kept to by the Military Department when mobilisation is actually ordered. With all due deference, I must say that I entirely disagree with this theory, because, provided that the flexibility and elasticity so necessary from a military point of view are fully provided for, and the strategical conditions, with variations, are fulfilled, there appears to be no reason why any great changes should be made at the time mobilisation is ordered. If this basis is accepted, a scheme can be drawn up to cover practically every possibility. Again, from what Captain Charteris stated at the commencement of his lecture, I think it may be gathered that, from a military point of view, railway concentration becomes a very important factor in the drawing up of any strategical scheme ; and he has shown us that, due to the success of railway arrangements in 1866 and 1870, Von Moltke was enabled to carry out his strategical intentions. Operations on a very large scale (probably much larger than we should have to deal with in our operations on the Frontier or elsewhere,) were drawn up then on a preconcerted scheme of railway concentration, and, the perfection of the scheme of 1870 (helped, no doubt, by the experience and knowledge of the weak points of the scheme of 1866), combined with the breakdown of the French railway arrangements, no doubt materially assisted Von Moltke in asserting his superiority and gaining his objective.

Unfortunately, in India, there have been few, if any, cases of railway concentration on any considerable scale, with the result that any scheme, however well worked out, may contain some inherent defects which are only liable to be disclosed when the scheme is put into actual practice. Such being the case, as actual experience can throw but little light on the method in which a scheme should be drawn up, extra care and forethought have to be given to the problem, so as to arrive at practical working schemes. Every point and detail will have to be carefully worked out, and no possibility left unforeseen, so that not only will the arrangements as drawn up be perfect in theory, but also allow a very considerable margin of safety as regards actual practice.

Railway concentration for any of the late campaigns in India will not, I regret to say, bear favourable criticism, but I think it is only fair, from a railway point of view, to say that this was due to :—

(a) *First and foremost,*

Lack of close touch between the military and railway authorities carrying out the concentration ; and

(b) *Secondly,*

to want of centralisation, as the railway authorities controlling the railway movements have undoubtedly not received, even at the time mobilisation has been ordered, sufficient detailed information to allow of the collection of stock and the concentration of their energies on any particular section of the line over which concentration was to run.

Without these two main factors, and it is perfectly impossible to get them without a preconceived scheme (even for the movement of a comparatively small force), it is clear that it is absolutely impossible to work out any scheme of railway concentration with any degree of success.

Captain Charteris has told you how the Railway Mobilisation Section of the Railway Board came to be created, and this section should eliminate the first of the disturbing factors above mentioned, and make, theoretically at least, the creation of any preconceived schemes possible.

Turning to (b), *i.e.*, want of centralisation: whatever the magnitude of the operations may be, the necessity for definite data is evident, and, unless the data given bears a considerable element of finality, the drawing-up of any railway concentration scheme becomes an impossibility. Therefore, it is incumbent that Army Headquarters, when they wish a railway scheme of concentration to be drawn up, should give, in the greatest possible detail, the units which they wish to move towards any particular base, the allocation of those units, and the time when the units are ready to start.

The conditions governing the drawing up in detail of a scheme on a large scale, as compared with one on a small scale, differ somewhat, and I propose to enlarge on them later.

As regards (c), *i.e.*, a separate line of railway advance to each base (if more than one). In order to give the necessary flexibility and elasticity to any strategical scheme, a separate line of railway advance for each base (where there is more than one) becomes compulsory. If the same line of railway advance becomes common to a movement towards more than one base, it is perfectly clear that any scheme drawn up on these lines can bear absolutely no element whatever of flexibility, inasmuch as one movement is dependent upon another, and any variation in the order of movement becomes impossible. I think I am correct in saying that any scheme of concentration got out by the German and other continental military authorities, whether towards the frontier or towards the sea, is based on the principle that each and every corps has allotted to it, as far as possible, a separate line of railway advance to the frontier or sea-port concerned, so that a simultaneous and independent movement can take place as desired.

As regards (d), ample notice being given when the scheme is proposed to be put in force. It must be remembered that even for

the concentration of a troop movement on a small scale, the normal traffic of a railway will have to undergo considerable dislocation at a time of military concentration, and when a large scheme of concentration is necessitated, military requirements become of such a considerable nature that civil requirements will have to be reduced to a minimum. For political and commercial reasons it is not desirable totally to suspend civil traffic, especially passenger traffic, and therefore arrangements must be made for such traffic, and for this purpose certain trains per day each way will have to be provided. Then, again, before any railway scheme of concentration can be put into force, stock and locomotives will have to be collected and moved (possibly to a considerable distance) so as to cope with the military requirements; the railway staff has to be strengthened; and on certain sections of the railway crossing stations must be opened; arrangements made for the efficient lighting of troop yards and platforms; and lastly (but not least), a mobilisation time-table put into force.

As regards collection of stock, etc., it sometimes happens that on the railways over which the bulk of any concentration of troops on a large scale will take place, the commercial lines are not the same as the strategical lines, and the collection and movement of stock and locomotives from the commercial sections to the strategical ones may be a task of considerable magnitude. As regards Staff: Running Staff (drivers, guards, etc.), and Station Staff (*i.e.*, Station Masters, Assistant Station Masters, Signallers, and Pointsmen) have to be moved from the parts of the railway unaffected (or only slightly affected), by concentration, to those sections over which heavy military traffic will take place. From the above alone, therefore, it will be seen that ample notice is required and the extent of such notice must necessarily depend on the magnitude of the operations to be undertaken.

As regards the putting into force of a mobilisation time-table, it is desirable that such a time-table should be treated as a secret document in peace-time, and only issued when mobilisation is actually ordered. Its custody would be entrusted to certain high officials of each railway, who are responsible for the actual carrying out of the scheme during concentration. A mobilisation time-table is necessitated for all operations, inasmuch as in all cases train timings have to be so drawn up as to give the necessary halts required by the military authorities at the stations selected as rest-camps, tea and watering stations, etc. Further, when concentration on a large scale is necessitated, passenger traffic for the public will, as before explained, be reduced to a minimum, and the majority of train timings be given up for military requirements. It may be questioned as to why it would not be possible, directly mobilisation is ordered, to put this time-table into force at, say 24 to 48 hours' notice; but it must be borne in mind that the cessation of a large civil traffic at a few hours' notice becomes almost an impossibility. The stock carrying such traffic is in running, and

loaded with passengers and general merchandise. It has to be vacated so that it can be available for the carriage of troops and transport. This again alone proves the necessity for notice. It must be borne in mind that on Indian railways the majority of the staff are Indians, and we have not in India, as on the Continent, a highly trained European staff and, the time-table not having been in circulation or studied by the subordinate staff, and bearing in its construction certain elements differing somewhat from those obtaining during normal conditions, requires very careful study before it is fully put into force. Even when a small operation is concerned, the bulk of the goods traffic on the railway or railways concerned will presumably have to give way to military traffic, and a special time-table be brought into force for such troop movements; but, as the stock required will not, as a rule, be very considerable, and the period of concentration be of no great duration, shorter notice than that required for a larger scheme can be accepted, and, since the time-table then adopted for troop traffic will probably take the place of the one utilised for goods trainings, a period of some two or three days' notice before concentration would probably meet the case.

CONSIDERATIONS AFFECTING THE SELECTION OF THE AUTHORITY TO CONTROL RAILWAYS IN TIME OF WAR.

Dealing with railway concentration generally, India, as organised from a railway point of view, is well suited for the carrying out of any concentration scheme by the civil railway administration. It must be remembered that the organisation of Indian railways is more or less under one Board of Control, which Board has considerable powers over the railway administrations of private companies, and supreme powers over lines owned and worked by the State. All railway officials are subject to the Official Secrets Act, and railway officers, therefore, can safely be entrusted with secret documents. Indian railway lines, as a whole, are far too large to be supervised during mobilisation by military officials, even had the latter sufficient railway experience. The staffs employed are better qualified to work the railways, as they know their peculiarities, limitations, and local conditions. On the state railways the officials are all servants of Government, and look to the head of their own administration for promotion and advancement; they will naturally, therefore, in their own interest, work to make any scheme of concentration which has received the approval of, and which the railway administration has undertaken to carry out, a success. It can therefore be maintained that they will do better work under their own officers than they would if placed under military control during such time of mobilisation; as there might be a tendency on the part of the civil railway officers in charge to resent outside interference, and this feeling if it did exist, would no doubt spread to the subordinates and lower grade officials working with them, and so jeopardise the success of

a scheme. From the above it would appear to be bad policy to take the working of a military scheme of railway concentration in time of war out of the hands of the civil authorities who work the railway systems during times of peace.

Dealing with railway construction generally, the construction of railways for strategical purposes has never, in this country, received the attention that it receives on the Continent, where military considerations carry great weight in the construction of railway lines generally. The policy adopted throughout India generally, even by any railway system constructed and administered by the State, is that the commercial point of view takes precedence. This is due, no doubt, to the fact that funds are always difficult to obtain for any unremunerative work, and hence the difficulty of obtaining any funds for strategical railway lines. Certain important lines, however, have been constructed, and, on the whole, the efficiency may be stated as good.

The mere drawing up of a preconcerted scheme of railway construction must bring to light the limitations of the strategical railway lines used, and, these being brought to the notice of the Railway Department (Railway Board), steps can be taken to improve matters. The policy now adopted is that the Railway Board have accepted all responsibility for the carrying out of all railway transport arrangements, and the construction of lines required for war purposes, and it is maintained that the effect of this policy is likely to improve in the future, in all respects, the condition of strategical lines; as the onus of any failure in a military concentration scheme due to insufficient railway arrangements will fall on the Railway Board, and through them on the Civil Government (of whom on such matters, they are the advisers) itself. Had this policy been in force in the past it is conceivable that the efficiency of strategical lines might have been more marked.

THE ESSENTIALS FOR THE SUCCESS OF A PRECONCERTED SCHEME OF RAILWAY CONCENTRATION.

Briefly, they are—

- (a) Freedom of movement;
- (b) Adequate military and civil control.

As regards (a), i.e., *Freedom of movement*.—From experience gained in the working of civil traffic, I am convinced that without freedom of movement in railway working, no scheme, however carefully drawn up, can be anything but a failure. In most cases, when a heavy traffic takes place on a railway, there is at the commencement a certain amount of congestion, resulting in difficulties in obtaining stock for movement of the traffic offering. This congestion is often put down in ignorance by the lay mind to insufficiency of stock. Railways in India are, as a rule, well equipped with rolling-stock (especially for goods traffic), and have fairly good terminal and junction facilities; and I am perfectly convinced that the congestion is due, to a very great extent, if not altogether, to

want of freedom of movement, caused principally by putting more trains on the road than it can reasonably carry. Although a time-table graphic for a single line of railway, with stations six or seven miles apart, will allow of a considerable number of train timings being shown each way, yet in actual practice the theoretical number so arrived at is far too large, and a factor of safety, say of 40 per cent or even of 50 per cent of the timings that could be put in on a graphic, is far more like a practical working figure. For this reason, any military scheme of concentration drawn up should be so got out as to allow of a considerable margin of safety and not allow the rails to be overrun. Most roadside crossing stations are only fitted to take one or two trains into their sidings when the main line is occupied, and directly congestion does take place trains are held up all over the road; the automatic flow ceases and congestion, which is the slowest form of advance, inevitably takes place. I will refer in detail later to the actual preparation of any time-table drawn up for concentration purposes.

As regards (b), i.e., *Adequate military and civil control*.—In order that any railway concentration of any magnitude can be worked to carefully and correctly, instructions will from time to time be issued by the Railway Board to the separate railway administrations as to the methods in which the scheme should be carried out. Normally speaking, the best method appears to have an officer detailed in peace-time, who will have the custody of such secret documents as may be issued, so that full acquaintance may be made with the scheme beforehand and its success assured when actually put into force. Such officer or officers, during actual time of concentration, will have to work in close touch with the military authorities. The Railway Board, having undertaken the responsibility for the movement of troops and transport in time of war, it naturally follows that the actual control and running of trains, provision of stock, control of staff, etc., will be left in the hands of the railway authorities. The military concentration staff, however, will undoubtedly be most useful, as they will become the intermediaries between the military and railway authorities, and will be able to smooth away any difficulties that may arise. Where their services will be of the utmost value will be at the bases, for the supervision of detraining troops and transport. Bases must be kept clear, for congestion at them will be most detrimental to the success of any railway scheme; and only loyal co-operation between railway and military authorities controlling the arrangements at the detraining bases can effect this, and allow the steady flow of loaded trains into it and of empty trains out of it to continue unchecked. For this co-operation to be effective, the military staff should have a perfect knowledge of the railway arrangements and requirements under which the concentration scheme will have been drawn up, besides a full acquaintance with all the military aspects of the scheme. Their functions, I take it, will of course be to deal with purely military matters, and to adopt the

policy of non-interference with the civil railway authorities controlling the actual railway part of the concentration. They will be informed of the progress of all movements and of any dislocation that may arise, and can then take any action with the local railway administration which may be necessitated as the scheme goes on. It is advisable that the officers deputed from Army Headquarters to work in conjunction with the railway administrations during railway concentration should have been pre-selected on account of their complete knowledge of any such scheme in its entirety. They should also have considerable knowledge of the railway arrangements, as without these qualifications it is more than possible that the difficulties of railway working will not be appreciated, and impossibilities may be asked for in consequence of such lack of knowledge.

I now propose to demonstrate the—

RAILWAY METHODS ADOPTED IN DRAWING UP—

(a) MOVEMENTS ON A LARGE SCALE, AND

(b) ON A MINOR SCALE.

Dealing first with a move on a large scale, or general concentration, it may be assumed that during such period the resources of all railways (as regards locomotives, stock, staff, etc.) will be placed at the disposal of the Railway Board for the purpose of carrying out an efficient scheme of concentration. Such being the case, provided definite data are got out and full details prepared for a preconcerted movement, it is possible to carry out, without any considerable difficulty, any scheme that the military authorities may require.

In working out details for any railway scheme of concentration, it is essential that the allotment of troops and transport detailed in the scheme for the separate lines of railway advance are more or less suitable from a railway point of view. This is necessary so that the same lines of rails will not be used for the separate units detailed for the different bases, which would have the effect of hindering the progress to that particular base, and of losing the flexibility and elasticity on which Captain Charteris has laid such stress. Therefore it is probable that when any scheme is devised from a military point of view, slight modifications may have to be made, provided that they necessitate but slight changes so that the railway requirements may also be covered. In the military requirements, it follows, therefore, that any scheme of this nature can only be drawn up after considerable discussion. From a railway point of view, as aforesaid, the guiding factor is that there should be a separate line of advance (as far as possible) to each base. This is very necessary, so that the movement to any one base affected can be made independent of or simultaneous with the railway movement to any other base. The new redistribution scheme aims at placing troops in divisions in echelon along the main trunk lines of railway, and this will make the allotment of troops for any scheme simpler than it was before, and will not only simplify the railway

movements for any scheme, whether towards one of the frontiers or a seaport, and at the same time fulfil all military requirements, but allow of the rate of concentration, as compared with the past, to be enhanced. It will be seen from the above that a scheme of any magnitude got out by the railway authorities in consultation with the military authorities must be more or less of a compromise between the cast-iron rigidity as regards data, so very desirable from a railway point of view, and the flexibility and elasticity so necessary from a military point of view.

A study of two maps* on the wall will prove the necessity for what has been aforesaid. Both maps are similar and show a map of India with its railway systems. Turning first to map A,* it will be seen that there are four imaginary bases, one shown in red, one in blue, and two in green circles. Further, on the map, the divisional areas and boundaries are shown in black and numbered. For the purpose of example, the following allotment of divisions has been taken:—The 2nd to red base, the 3rd to blue base, and the 7th to green base.

As regards reinforcing, the 1st Division has been taken as reinforcing the 2nd, and the 5th the 7th, leaving the 6th or 8th to reinforce the 3rd Division.

It will be seen that the reinforcement of the 3rd by the 6th Division must mean a congestion on the railway line of advance, as the same line of rails has to be used for the movement of both the 6th and 5th Divisions.

If the 8th Division is taken to reinforce the 3rd, we have the same thing happening, as the advance of the 7th is thus hampered.

If the 9th is used to reinforce the 7th and 5th, still further congestion takes place. The disadvantages, from a railway point of view, of such an allotment are therefore obvious.

As regards Map B,* the primary allotment for the three bases has been taken as the same, *i.e.*, the 2nd to the red base, the 3rd to the blue base, and the 7th for the green base. The allotment for reinforcements has been taken as the same as regards the red base, *i.e.*, the 1st Division will reinforce the 2nd, and, in addition, the 4th Division has been shown as a further possible reinforcement for the 2nd Division. The 3rd Division is now reinforced by the 5th and the 7th by the 8th. The result of this is that practically a separate line of railway advance can now be detailed and allotted permanently for each base, so that a complete concrete scheme can be got out, and each line of advance worked independently or simultaneously with both or any other of the lines of advance. The 6th Division can reinforce, if necessary, the 2nd Division by sea, in place of the 4th (which might not be available), and similarly the 9th Division can reinforce the 7th and the 6th reinforce the 5th or the 7th, without fouling the lines of advance to the other bases.

* Not reproduced. The four imaginary bases on these maps were: Jammu, red; Pathankote, blue; Dehra Dun and Kathgodam, green.

If the 6th Division is not used, the 9th Division can be used either for the reinforcement of the 5th or the 2nd, the latter movement being by sea. This example bears in itself elements of elasticity and flexibility from a military point of view, and is also a good scheme from a railway concentration point of view.

Turning now to the general principles adopted in preparing a scheme of railway concentration, they can, then, be taken as follows:—

(a) A separate line of railway advance must first be fixed as far as possible to each base, and where circumstances make it compulsory for the same lines of rails to be used to more than one base, movements should be made in the opposite direction. Where a double line exists, and it is necessary that this line be utilised for a simultaneous advance towards one base, certain timings will be allotted for the movement towards more than one base, and separate timings for the other base or bases, and so on. The above having been determined, and the military considerations having been considered, the mobilisation time-table is then drawn up. In such a time-table civil requirements must be cut down to the minimum. This will be necessary for any expedition of a considerable magnitude, whether towards the frontier or to a seaport or ports for an oversea expedition. The time-table as drawn up should be of such a nature as to allow of a considerable margin in the number of train timings in case of unforeseen difficulties. The speed and load adopted should be uniform, as from a railway point of view a multiplicity of time-tables is objectionable, and a uniform rate of speed would probably pay in the end, especially as a factor of safety as regards making up time is absolutely essential. The actual rate of advance must naturally be governed by the class of country through which the movement has to be made, that is, whether through hilly country or through flat country. Halts in accordance with the requirements of the Military Department, of which Captain Charteris has spoken generally, must be provided, and, finally, the rate of advance adopted is dependent upon the carrying capacity of the line nearest the base, and in any scheme of concentration, whether towards a frontier or to a seaport, this becomes naturally the limiting factor in drawing up a time-table, the actual number of train timings always varying with the circumstances of the line. A very considerable number of trains on a single line of railway (18 each way) ran over the Trans-Siberian railway during the Russo-Japanese War, but only at the latter end of the campaign, and it must be remembered that the strategical requirements necessitated very stringent and urgent measures being taken, and a scheme had to be improvised at once to meet such requirements; risks had to be taken, and general principles of railway working ignored which would not be justified in drawing up in peace-time a preconceived scheme of railway concentration.

A time-table as above mentioned having been drawn up on the above lines and passed by the military and railway administrations can then be utilised as military requirements necessitate. Army Headquarters, having specifically stated what troops and transport

have to be despatched, group them in small blocks, showing the station from, order of despatch in sequence, and dates on which they are ready, according to the different phases of the movement. Such blocks may have to be slightly modified to meet railway requirements and ensure the rate of concentration being as rapid as possible. Each unit in these blocks can then be allotted a railway time or timings by the Railway Board's officer drawing up the scheme in consultation with the Chief of the Staff's Division. A system of small blocks makes any scheme of a more elastic nature than would be the case if large blocks were framed, as not only is the time required to move such blocks considerably, but in actual practice their movement would be very intricate and difficult to arrange for.

As regards timings for troops remote from the base of operations and running on a railway over which the bulk of the timings will still be allotted for civil traffic, it is obvious that there are two ways, or more, of arranging for the movement of such troops up to the base of operations. One method is for such movements to be made by the Divisional Commanders themselves direct with the railway concerned for a timing up to the junction with the railway over which the bulk of the movements take place, and from there an onward timing be allotted to such units in the mobilisation time-table on the principal railway concerned. The other alternative is that Army Headquarters should, in communication with the Mobilisation Section of the Railway Board, arrange for the whole of the movements beforehand from the starting station to the base. The latter alternative, I consider, is the better plan. On such railway (*i.e.*, the ones remote from the base of operation) the military trains, as above stated, can run in addition to normal traffic, preference being given to them in running. Blocks, having been worked out in detail, showing the composition of each train for each unit in the block as regards class of stock, etc., and each unit having been allotted a train number or letter showing its specific timing, can then be summarised separately for each railway concerned, so that the railway administration can see at a glance the worst possible conditions it will have to expect during concentration. For instance, there may be a movement (on any particular railway) towards one or more bases. Blocks will be worked out for this railway for each base and summarised as above. The worst possible condition that would have to be met is obtained by taking the total stock required for the largest block on each line of advance. With such information before them, a railway administration can decide as to the notice required for such a combined movement. The notice required for each block or blocks in each component scheme can then be fixed generally.

I think I am correct in saying that the system adopted on the Continent by a well-known military power for a scheme of concentration is that a daily programme is worked to, 20 hours out of every 24 hours being fixed as the normal running time per day for military traffic, the balance of four hours being taken as a factor of safety. This system, for many reasons, does not appear to be suitable for

India generally, first, on account of difficulties that would be experienced in the collection of stock; secondly, by reason of the greater distances that have to be covered, and thirdly, because considerable notice is required by the railway authorities before any movement can take place, and 24 hours' notice of change of programme would not cover requirements in this country.

As regards (b), *i.e.*, a movement on a small scale, no doubt it would be convenient from a military point of view if the time-table as utilised for a major scheme of concentration could be utilised for a minor one, for, as so frequently happens, complications may develop so quickly that a major scheme of concentration might have to follow a minor one; and, therefore, assuming that the troops allotted for a minor expedition form a component part of the force for a major expedition, it would be most useful if the same timings as given for those units could be allotted for both schemes. From a railway point of view, however, this is not always possible, as in a minor scheme military requirements do not necessitate the bulk of the resources of a railway being given up for military purposes at the expense of civil requirements, and therefore for a small expedition only a certain number of daily timings can be allotted for military purposes, either in place of or in addition to those timings normally used for the public traffic.

One possible method of meeting this want might be to get out certain fixed daily timings which should be continuous from the railway most remote from a base up to the base itself on the direct line of railway advance to such base or bases. These lines of advance should correspond with those laid down for an advance on a large scale. These timings may be concrete or can be fitted in with the normal working time-table in force on the railway and kept up to date as the timings of mail and passenger trains vary. As, during concentration, troop traffic will take precedence of all goods traffic of every description, it is not considered necessary to fit in these troop timings on the railway graphic with goods train timings, and one solution is that when mobilisation does take place, goods traffic, or the bulk of it, will be temporarily suspended, and troop timings take the place of goods timings in the time-table. From these timings, provided the allocation of troops is fixed, and the dates in which they are ready to move definitely stated, a preconcerted scheme, even for the movement of a small force, is quite feasible, and allows a railway administration a better opportunity of carrying out concentration in a satisfactory manner, as the mere fact of having a preconcerted scheme shows what stock will have to be collected, at what stations, and on what dates, and the actual carrying out of the scheme then becomes more or less a matter of machinery.

METHOD OF ADVICE TO RAILWAY ADMINISTRATIONS.

For the success of a scheme of railway concentration in the time of war, it is necessary that the railways concerned in working such a scheme should be given certain instructions and advice as to its

working in time of peace. The more concrete the information given and the simpler it is, the better. Generally speaking, the concentration time-table would be got out by each railway administration and based on the timings required by the railway representative of the Railway Board's Mobilisation Section, which time-table would have, as regards halts, etc., to be approved by the military authorities. From this time-table the Railway Board's representative would allot to every unit of troops, transport, ordnance, supply, or hospital, a definite timing from the entraining station to the detraining station. Such information can then be summarised, and sent to the Traffic Superintendents of the different railways for their approval and scrutiny. This having been done, the Railway Board can issue to the railways concerned, as secret documents, a pamphlet embodying the details as to the stock, etc., required, and also issue general instructions as to how the scheme is to be carried out, together with the form of advice in which the railways will be advised when concentration has been decided upon by the military authorities. In other words, preconcentration, so essentially necessary for the carrying out of a scheme, can be arranged for, so that when the time actually comes for concentration the railway administration can refer to the instructions laid down for its guidance, etc., and carry them out *in toto*, on advice being received that the movement of such and such a block for such and such a base will take place on such and such a day. The normal order of blocks will actually depend on military requirements, and therefore it is not considered necessary generally to advise the railways concerned as to this order, and such information might make them draw incorrect conclusions if the normal order of change were departed from.

GRAPHICS.

In order to show the movements during concentration for any scheme on a considerable scale, it is advisable to utilise a graphic. The ordinary railway graphic, as used in railway working, is not one which to the uninitiated is easy to follow. Such being the case, for railway staff officers a simpler form is required, and I put forward herewith a map* which shows in detail, day by day, the movements of each unit of troops from the time it arrives at the junction (or emanates from any station beyond such junction) of the railway nearest the base, until it arrives at the detraining base. A system of colours, day by day, shows the sequence and dates of arrival. On this graphic all halt-stations and rest-camps, together with stations where short halts for tea and water are allowed, are shown, so that the railway staff officer at any important junction, entraining or detraining station, can see at a glance what trains have to pass through, start from, or arrive at, his station. With this diagram is issued a table showing units, train numbers, and the composition, in detail, of each train in the block, so that it would only be necessary for a railway staff officer to have to refer to his mobilisation time-table, the graphic, and the table of rolling-stock.

* Not reproduced.

SUMMARY.

To sum up, it will be gathered from the above what the arrangements should be for railway concentration generally, and any scheme worked out on these lines should place the railway arrangements on a sound footing. Strictly speaking, the main principle is, as previously noted, that the Army Staff state the troops that have to be despatched, from what station, and the time of their despatch and sequence according to the different phases of the movement. This will make a comprehensive working scheme possible; that is, specific trains can be detailed and timed for different units of troops, ordnance, or supply. Modifications will, no doubt, be required from time to time; but it cannot be too strongly emphasised that, for successful railway movements, it is most desirable that, in the main, any original scheme of mobilisation as drawn up should not be departed from, as any considerable alteration of the scheme will involve a recasting of trains, and entail the work having to be done all over again. Big changes must cause a great deal of work to become useless, and in order to keep the time-tables up to date, the Railway Board must be kept informed of any alterations in the army scheme of mobilisation as early as possible. Failing this, I maintain that any scheme as worked out will cease to be a practical possibility in actual working.

If these guiding principles are adopted, and the loyal co-operation of the partners responsible for the working of the scheme is assured; there is every hope that any scheme of concentration may be brought to a successful issue.

Remarks by Sir T. Wynne, President, Railway Board.

Captain Charteris has pointed out the confusion that results in attempting a large mobilisation without having the railway arrangements all worked out beforehand, and the necessity for this is more particularly the case in India.

For railways in India to be able to carry out a large mobilisation with certainty and without confusion, the two essential conditions are:—

- (a) That the railway part of the mobilisation should be carefully worked out beforehand.
- (b) The railway should be given as much previous notice as possible of the intention to mobilise on this worked out scheme.

Major Cameron has given several reasons for the necessity for these two conditions being complied with, and I will add a few others.

To begin with, a railway in work is a very complex machine. In India the railways are worked so as to comply with the public requirements of passengers requiring to travel and with the demands of trade for the carriage of merchandise to different parts of India and to the ports for export.

The time-tables of trains and the general working arrangements of the railways are based on the carriage of passengers and goods requiring to be carried by now fairly well-defined routes and under fairly well-known conditions as regards speed and number and class of trains to be run.

A large mobilisation is quite a different proposition. An entirely new traffic has to be dealt with both in numbers to be carried, destination, and general conditions of transport. Besides this it has to be carried out as a concentrated movement; the ordinary peace-time trains movements having to give way to it.

To meet this new traffic the ordinary time-tables are of no use, designed as they are for an entirely different sort of traffic and to other destinations.

To carry out a large mobilisation, the whole of the peace-time train timings have to be abandoned on the lines on which the military bases are situated and partially so on other lines.

Locomotives and staff have to be re-arranged and strengthened at places to meet the new conditions that have arisen.

Time-tables for a big scheme of transportation cannot be made at short notice and they require a great deal of thought and fitting in. You cannot prepare such time-tables unless you know first what troops and stores have to be moved, and in what order they are to be moved, and from and to what places they have to be carried. You cannot, certainly in India, hope to move large bodies of troops by specials running to hurriedly made time-tables, and the reason is that the staff of an Indian Railway has its limitations and the staff stationed at engine-changing stations, being only sufficient for ordinary working, has to be reinforced.

Working with a time-table put clearly before them, and designed so that each train shall be able to run to time, the staff of Indian railways can manage to carry along. They are not capable of dealing with a large number of trains running out of time and the running of which they have only had short notice. In the latter circumstances they would have to arrange crossings and decide on certain trains taking precedence of others, and the result would be they would make mistakes involving confusion and congestion, the consequences of which might be very serious indeed.

The only way to get the best work out of the staff is to have everything cut and dried beforehand for them, and to work closely to what has been arranged, leaving as few train despatching and crossing questions for them to settle as possible.

Now as regards the necessity for railways having as long notice as possible of any intended large mobilisation, it must be recollected that in India railways work on very much smaller margins as regards locomotive and traffic staff and rolling-stock than is done in other countries in the West.

English railways are prepared at all times to carry large numbers of excursionists by special trains at any time to their destination, and run regular trains in several portions if there is a sudden

rush of ordinary passengers. This can only be done by keeping ready for use a very much larger number of engines and having in hand a very much larger number of staff and carriages than are ordinarily required. The justification for keeping such a large reserve of power of transport is that it is, generally speaking, fairly well employed, and also because there are also many competitive routes in England. It is evident, therefore, that in England railways can meet, at short notice, any sudden military demand for railway carriages out of the reserve resources they have in hand. I imagine, though I have no personal knowledge of it, that a similar reserve is maintained on railways on the Continent.

Now in India we keep no such large reserve of staff and rolling-stock, because for a good part of the year there would be no steady use for it, and financially it would not be justifiable. The number of engines, carriages, and wagons have been largely increased in India during the last three years, but the number is still below what is wanted to deal with an ordinary busy season's traffic.

Now if a large mobilisation is suddenly required in the busy season, the only way it can be dealt with is by at once stopping public traffic; but this cannot be done immediately, and the stock collected at the stations required, for it takes time to do this, the more so as there is no large reserve as in Europe to fall back on in such a case. Again, during the slack season, staff are reduced as much as possible and engines temporarily laid up. To get this staff together and put the engines in running order all takes time.

From the railway point of view, to ensure success, the railways must know beforehand what has to be carried, when, and from where; they can then work out plans in anticipation. They must also be given as much previous notice as possible of the intended mobilisation. The army and the railways should, in matters of railway transport, work closely together. Railways must be taken into the confidence of the army if the best results are to be obtained, and I am safe in saying that this confidence will not be abused.

Remarks by General Mullaly.

From the very instructive lectures that we have heard, and the remarks which have followed, I think we all see that the subject is not only of interest to experts, but that it is one in which we are all greatly concerned. Of course, as in the case of all preparations, there can be no finality; as it is evident that as new lines are built or are doubled, and new sidings and crossing stations made, etc., we must be continually adjusting our arrangements so as to obtain the greatest advantage from the improvements effected. That is, so far as Headquarters are concerned, and emphasises the necessity for close and continued communication between the railway authorities and Army Headquarters. But it will also be seen that it is a matter which requires careful study on the part of all staff and regimental officers, as it is evident that in large concentrations, the efforts and loyal co-opera-

tion of all are essential for success, so as to reduce delays and difficulties to a minimum.

I would ask you all to unite in giving a cordial vote of thanks to Major Cameron and Captain Charteris for the trouble they have taken in giving us these very interesting and instructive lectures; and I feel sure that we all wish to include our thanks to Sir Trevredyn Wynne for having so kindly given us the benefit of his expert knowledge of the subject. We are greatly indebted to the Railway Board for the help and advice they have always so readily accorded us, and Sir Trevredyn Wynne has added to our obligations by his support this afternoon.

TABLE OF ROLLING-STOCK

REQUIRED FOR

Block P.-A.

Unit.	Train No.	Day of move.	Station of departure.		1st Class.	2nd Class.	Composite.	Gnl (Class.	Wagons, covered.	Open, low-sided.	Horse or cattle wagon.	Horse-boxes, double.	Horse-boxes, single.	Camel-loading.	Powder Van.	Brake Van.	Total.	REMARKS.
Mountain Battery	{ A B }	1	Yabmob	...	...	...	1	5	4	...	16	1	...	...	...	2	29	
		1	Do.	...	...	...	1	3	2	...	3	...	...	...	...	2	16	
Supply	J	1	Yabmob	...	...	...	...	...	29	...	...	...	...	...	...	1	30	
Do.	K	1	Do.	...	...	...	...	...	29	...	...	...	...	...	...	1	30	
Battery, Royal Field Artillery.	{ D E }	1	Lingrac	...	...	...	1	3	1	7	13	2	...	...	...	2	29	
		1	Do.	...	...	...	1	2	1	7	9	...	...	...	...	2	22	
Squadron Native Cavalry.	E	1	Startabad	...	...	...	1	4	1	...	22	...	...	...	...	2	30	
		1	Lingrac	...	...	...	1	1	1	12	12	1	...	...	...	2	30	
Ammunition Column. Royal Field Artillery & Native Field Hospital with C.	{ A B C F }	2	Do.	...	...	...	1	1	1	12	12	1	...	...	...	2	30	
		2	Do.	...	...	...	2	3	5	5	6	1	...	...	...	2	26	
		2	Do.	...	...	...	1	1	1	12	12	...	...	...	...	2	29	
		2	Do.	...	3	...	1	18	3	...	1	1	...	...	...	2	29	
British Infantry	G	...	Do.	...	1	...	1	11	1	...	2	2	...	...	...	2	23	
British Field Hospital	I	...	Do.	...	1	...	1	11	1	...	2	2	...	...	...	2	23	

for Block P. A.

Unit.	Train No.	Day of move.	Station of departure.	1st Class.	2nd Class.	Composite.	3rd Class.	Wagons, covered.	Open, low-sided.	Horse or cattle wagon.	Horse-boxes, double.	Horse-boxes, single.	Camel-loading.	Powder Van.	Brake Van.	Total.	REMARKS.
British Infantry ...	{ 6 & T 7 & V	2	Noor Ahmed ...	...	...	1	14	2	...	1	1	...	...	...	2	29	...
		2	Do.	...	...	...	7	1	...	1	1	...	...	...	2	13	...
Battery, Royal Field Artillery.	{ Y & C Z & C	1	Ropani	...	...	1	3	1	7	13	2	...	...	...	2	29	...
		1	Do.	...	...	1	2	1	7	9	...	...	...	...	2	22	...
2 Companies, British Infantry and Native Infantry.	{ 9 M & G 14 M.H.	1	Meab	...	...	1	13	2	...	1	1	...	...	...	2	21	...
		1	Do.	...	1	1	17	3	...	2	3	...	...	...	3	30	...
Regiment, Imperial Service Cavalry.	{ 16 M & A 17 M & B 9 M & D 19 M & E 12 M & G	2	Cettin	...	...	1	4	2	...	19	1	...	...	...	2	29	...
		2	Do.	...	...	1	4	2	...	19	...	...	1	...	2	29	...
		2	Do.	...	...	1	4	2	...	19	...	...	...	...	2	26	...
		2	Do.	...	...	1	4	2	...	19	...	...	1	...	2	29	...
		2	Do.	...	...	1	4	2	...	17	...	...	...	...	2	26	...
Indian Infantry Pioneer.	{ 16 M and A. D. 17 M and B.	1	Mungleb	...	1	1	16	3	...	3	2	...	...	...	2	29	...
		1	Do.	...	...	1	6	1	...	2	1	...	...	...	2	13	...
Totals				7	2	12	103	26	14	125	12	...	2	...	26	...	...

Foreign lines Stock for Block P.A.

Imperial Service Infantry.	W & D...	2	Attulac	...	1	1	...	10	3	...	11	1	...	...	2	29	...
	N & E...	2	Do.	...	...	...	1	6	1	...	19	1	...	...	2	30	...
Ditto	S & A...	3	Sardam	...	1	1	...	10	3	...	11	1	...	...	2	29	...
	V & B...	3	Do.	...	...	...	1	6	1	...	19	1	...	...	2	30	...
Ditto	E ...	3	Startabad	...	...	1	1	17	2	...	6	1	...	...	2	30	...
	G ...	3	Do.	...	...	...	1	5	3	...	6	...	...	...	2	17	...
Imperial Service Sepoys and Miners.	F ...	4	Behandobustnagar	...	...	...	1	6	2	...	11	1	...	...	2	23	...
	H.W.C.	4	Dittonpore	...	1	1	...	10	3	...	9	1	...	...	2	27	...
Imperial Service Infantry.	D.R.D.	4	Do.	...	...	...	1	5	1	...	...	1	...	12	2	22	...
Ditto	C ...	3	Hitchabad	...	1	1	...	10	3	...	9	1	...	...	2	27	...
	F ...	4	Do.	...	...	...	1	5	1	...	...	1	...	12	2	22	...
Supply	J ...	1	Meer Mian	...	...	...	...	...	29	...	...	...	...	...	1	30	...
Do.	K ...	1	Do.	...	...	...	...	...	29	...	...	...	...	...	1	30	...
Do.	J ...	1	Startabad	...	...	...	...	...	29	...	...	...	...	...	1	30	Run
Do.	K ...	1	Do.	...	...	...	...	...	29	...	...	...	...	...	1	30	daily.
	G & G.	1	Noor Ahmed	...	1	1	1	17	3	...	2	3	...	...	2	30	...
3 Battalion Indian Infantry.	7 & H.	1	Do.	...	...	...	3	18	3	...	...	...	...	...	2	26	...
	8 & I.	1	Do.	...	1	1	1	17	3	...	2	3	...	...	2	30	...
	9 & H.	2	Do.	...	1	1	1	17	3	...	2	3	...	...	2	30	...
4 Companies, British Infantry.	6-N	1	Akyab (from Pabar)	...	2	...	1	13	3	...	2	1	...	...	2	24	...
Totals				13	8	26	226	238	55	222	29	24	60	898			

SAMPLE OF CONCENTRATION TIME-TABLE, RAILWAY.

TABLE II.		TIMINGS.										REMARKS.
Station.		Pass.	G.	H.	I.	K.	B.	O.	D.	E.		
Dikronpore ..	...	Dep.	1-24	10-50	12-46	15-27	19-9	21-27	0-13	2-39	6-6	...
Sardam ..	...	Arr.	3-46	13-37	15-39	18-15	21-54	0-15	3-8	5-31	8-54	...
Atalla ..	...	Dep.	5-49	15-10	17-8	18-23	22-9	0-31	4-48	6-16	9-50	...
Hesperides ..	...	Arr.	7-53	17-49	19-43	21-3	0-46	3-24	7-23	8-53	12-25	...

For onward timings to Peshawar, see pages 1 and 2.

TABLE III.		TIMINGS.										REMARKS.
Station.		BB	D	E	F	G	K	A	B	C		
Hesperides ..	...	Dep.	13-22	1-7	6-11	8-15	10-28	17-42	18-58	21-35	22-56	...
Meer Mian ..	...	Arr.	15-32	4-34	9-38	11-42	13-55	21-9	22-25	1-23	2-23	...
Lamuria ..	...	Dep.	16-2	4-44	9-4	11-52	14-5	21-19	22-35	1-52	2-33	...
Yabmob ..	...	Arr.	18-20	6-56	13-10	14-4	16-16	23-31	0-47	3-44	4-43	...

For onward timings to Peshawar, see pages 1 and 2.

TABLE IV.		TIMINGS.													REMARKS.
Station.		Pass.	B	C	D	E	F	G	H	I	J	K	A		
Lingrac	...	Dep.	16-56	2-12	3-17	5-30	10-30	13-3	14-50	16-35	18-17	19-43	22-5	23-21	
Euparabas	...	Arr.	17-3	2-22	3-27	5-40	10-40	13-13	15-0	16-45	18-27	19-53	22-15	23-31	
Bekundobastnagar	...	Dep.	17-33	2-32	3-37	5-50	10-50	13-23	15-10	16-55	18-37	20-3	22-96	23-41	
Hesperides	...	Arr.	18-50	3-53	5-3	7-16	12-16	14-49	16-36	18-21	20-3	21-29	23-51	1-7	
For onward timings to Peshawar, see pages 1 and 2.															

For onward timings to Peshawar, see pages 1 and 2.

SAMPLE OF PLAN OF MOVEMENT.
RAILWAY CONCENTRATION, EASTERN LINE.
Block 6—(contd.)

Military Train No.	Unit.	Mobilisation Station.	ENTRAINMENT.			INTERMEDIATE TIMINGS.			DETRAINMENT.			REMARKS.	
			Station.	Day of Block.	CONCENTRATION TIME-TABLE.		From	CONCENTRATION TIME-TABLE.		Station.	Day of Block.		Time.
					Timing.	Table.		Timing.	Table.				
	1 Battalion, Indian Infantry.												
	1st train ...	{ Dittonpore ... }	Dittonpore ...	2nd	B	II	{ Hesperides... Yabmob ...	E	III	Paunchabad...	3rd	23-25	
	2nd " ...		Ditto ...	2nd	C	II	{ Hesperides ... Yabmob ...	F G	III I	Ditto ...	4th	2-49	
	Battery, Royal Field Artillery.												
	1st train ...	{ Lemuria ... }	Lemuria ...	3rd	D	III	Yabmob ...	A	I	Peshawar ...	4th	4-49	
	2nd " ...		Ditto ...	"	E	III	Ditto ...	M	I	Ditto ...	"	8-41	
	Battery, Royal Field Artillery.												
	1st train ...	{ Hengelly ... }	Ditto ...	4th	F	I	.....	...	...	Ditto ...	"	10-7	
	2nd " ...		Ditto ...	"	H	I	.....	.....	...	Ditto ...	"	14-12	
	Divisional Ammunition Column.												
	1st train ...	{ Hengelly ... }	Ditto ...	"	I	I	.....	...	...	Ditto ...	"	15-51	
	2nd " ...		Ditto ...	"	J	I	.....	.....	...	Ditto ...	"	19-19	
	3rd " ...		Ditto ...	"	K	I	.....	.....	...	Ditto ...	"	21-16	
	4th " ...		Ditto ...	"	A	I	.....	.....	...	Ditto ...	"	23-25	

THE MECHANISM OF OVERSEA EXPEDITIONS.*

A Lecture delivered at Bombay.

BY CAPTAIN. C. F. DOBBS, BRIGADE-MAJOR.

I have three reasons which have influenced me in selecting the subject of oversea expeditions for discussion

Introduction. to-night, and as my concluding remarks are intimately connected with these reasons, it is just as well to start off with them.

Firstly, then, the chances or opportunities for gaining practical experience in this form of operation on any large scale in India are rare.

Secondly, that this class of operation probably does not appeal to the bulk of us, for the simple reason that the majority of us consider, no doubt, that under the general conditions of service in India, our own individual chance of taking part in some great oversea expedition is most improbable.

And thirdly, the last but by no means the least—it is appropriate to our surroundings, especially when we remember that we have the advantage of expert advice on such matters at hand. I allude of course to the Director and the officers of the R. I. M. Service, who are always with us, and to H. E. the Naval C.-in-C. and the officers of the R. N., who frequently visit this port. To-night we are fortunate in having Captain Lumsden, the Director of the R. I. M., and the officers of the R. I. M. Service present to take part in our discussion.

Now we all have had in varying degrees some experience of movements of troops by sea—not all perhaps, quite so pleasant as we might have wished, but still for all that, of some definite value. I am sure, however, that we all have noticed and recognised the necessity for system and order in embarkation and disembarkation, and strict discipline on boardship.

If then, system, order, and discipline are so important in peace trooping, I need hardly point out how much more important they become when a large force has to be first embarked, and later disembarked on some open shore.

A few of us present may possibly have been fortunate enough to have actually taken part in some difficult oversea operation of the type of Somaliland, or in large manœuvres on the scale of those held at Clacton-on-Sea. Such experiences must have been of value. But all personal experiences must necessarily be limited in extent. It takes the sum total of experiences to deduce really valuable lessons on which reliable data can be based. We have then to consult history and study many examples. I do not propose, however, to touch on any historical examples to-night, nor do I intend to consider the question from an Imperial or strategic point of view. On the

* Compiled from notes taken at the Staff College, Quetta, and books of regulations

contrary, I propose to limit our discussion to a less ambitious and possibly not quite such an interesting point of view, but for all that, one of practical value, in so much as it concerns all of us—from the highest to the lowest, from the general to the subaltern, the regimental officer as well as the staff officer—in fact to discuss certain details connected with such operations:—the “mechanism of oversea expeditions.” On some future occasion possibly we may be able to discuss a historical example; to-night we will consider only the dry detail from data based on past experiences.

On the axiom that “the whole contains the part,” I intend only to consider the case of an expedition which has to be carried out when complete command of the sea has not been assured (necessitating a naval escort), and the landing has to be carried out on an open shore, with every probability of attack by a civilised and well organised enemy, either during the attempt to land, or whilst the disembarkation is in progress. (See F. S. R. I (22) and II (26).)

Now, as with all military operations, the first thing necessary is exact and accurate information of the enemy, his resources, his country, his seaboard, etc., etc. This information would generally be all collected during peace by the Intelligence Departments of the Army and Navy. Should, however, such information not be available at the outbreak of war, it would have to be obtained by some means or other, if the chances of success were not to be left to blind fortune. In any case it is most necessary, before the troops are committed to a landing, to reconnoitre the coast and landings, and verify all information to date, should the data available be either not very clear, or not fully up to date.

Under modern conditions it is absolutely essential that the landing should come as a surprise, and if reconnaissances are carried out preparatory to a landing taking place, there is every chance, when dealing with a vigilant and well organised enemy, of the movement being given away. Where then, we have to obtain more data than we have got, or to verify existing information up to date, it will usually be necessary to carry out reconnaissances by secret means. This might possibly be feasible by the employment of secret agents in the hostile country, who could, by preconceived arrangements, be picked up off the hostile coast at night, from points 30 or 40 miles distant from the selected landing places.

There are various points to note with regard to reconnaissances of this type, and it will not be out of place here briefly to review some of these points. There are naval considerations and military considerations. The naval are—

- (1) Suitable landing places, with due regard to distance of anchorage, weather, foreshore, reefs, shoals, tides, surf, etc., etc.
- (2) Anchorages for the fleet, nature of anchorage, room, exposed or otherwise to weather or hostile naval attack, etc.

The question of information and reconnaissance.

(3) Currents and prevailing winds, etc.

(4) Charts available.

Military points are —

(1) The breadth of front on which a landing can take place.

(2) Beaches available, exits from the beach, forming up places, and suitable places of assembly.

(3) Obstacles to free movement inland.

(4) Suitable covering positions, and positions enemy would be likely to hold.

(5) Topography of the country inland, communications, etc.

(6) Water-supplies, etc., etc.

(7) Existing facilities for landing troops, animals, stores, and material for wharves, piers, etc.

(8) Any other details according to the nature of the operations to be undertaken.

In theory all this sounds simple, but in practice there has to be a great deal of give and take between naval considerations and military considerations pure and simple. It is most necessary then that officers of both services should thoroughly understand the requirements of the sister service, so as to appreciate correctly when one or the other consideration must give way, and a practical mean struck between naval and military points of importance. This can only be done by carrying out joint reconnaissances in times of peace, such as are carried out at the staff tours of our Staff Colleges.

Preliminary arrangements.

Well, we will assume that we have got all the necessary information up to date, and that the expedition has been decided on.

Now the first thing to be done is to decide on certain preliminary arrangements; on their clear conception and smooth-working will the tactical success to a great extent depend. These arrangements would be carried out by the joint naval and military authorities concerned, on the lines laid down in F. S. R., Part II (6) and (26), all details being worked out by the respective staffs.

As I have already pointed out under reconnaissance, the naval and military sides of the question would have to be weighed and a mutual agreement come to over the following important points:—

	Naval.	Military.
1. The strategical conditions involved.	Suitable harbours, nearness to proposed military base, etc.	Bases from which to operate.
2. The anchorages.	Space, depth, distance, etc.	Nearness to base.
3. Beaches available (based on 2, and selection	Suitability and covering fire, etc.	Exits, covering positions, roads, etc.
4. Procedure on seizing beach, and landing the force.	Position of ships, formations of boats, beach arrangements, etc.	Nature of operations, composition of force, objective of the covering force, sequence of disembarkation, etc.

As soon as the above points have been decided on the following details can be worked out and the necessary orders issued. (Also see F. S. R., Part I (41):—

1. The size and number of the transports required, their taking up, and fitting.

In India the Director of the R. I. M. is responsible for the latter part of the above arrangements. Full information on this subject is available in various books of regulations. I would refer you to the following, where you will find all the detail and necessary instructions concerning the taking up and fitting of ships, points to note, carrying capacity, necessary tonnage and space for calculation for voyages, etc., etc.—

Marine Regulations, Vol. II.

Army Regulations, India, Vol. X.

Field Service Regulations, India, Chap. XIV.

Field Service Pocket Book, pp. 84, 85.

I will touch on some of the more important points contained in these volumes as we go along, but I do not intend to weary you with too much detail.

As soon as the ships have been taken up and fitted, they are surveyed by a joint marine and military committee.

2 The port from which the expedition has to sail has next to be decided on.

3 Then the requirements in boats, launches, surf or horseboats, materials for building rafts and piers, etc., have to be arranged for.

4. After this the necessity of taking additional seamen, fatigue parties, coolie corps, etc., has to be fully considered and arrangements made accordingly.

5. Lastly, the distribution of troops on board, and the formation of the transport fleet at sea, has to be decided on and worked out.

You will see for yourselves what close co-operation is necessary between the naval and military staffs.

Conjointly with the above, operation, standing and other orders would be drawn up and issued as required. Operation orders would not usually be issued till the expedition had got to sea, to ensure secrecy. These would take the form of—

1. Joint naval and military orders.

2. Naval orders.

3. Military operation orders.

These orders would deal in their respective spheres with such matters as the nature of the operations to be undertaken, anchorages, beaches, landing arrangements, and operations. As to what such orders would contain, I cannot do better than refer you to our Divisional (VI) Report on last year's manœuvres, which contains complete examples of such orders.

This brings us up to the actual start of our expedition. In fact, we may say, "we have the ships, we have the men" and, let us hope, "we have the money too." We must now get on. The real "mechanism" of such operation is about to begin.

The points for consideration are :—

- (1) Distribution and allotment of troops to transports.
- (2) The embarkation.
- (3) Organisation and movement of the fleet at sea.
- (4) The approach to the hostile shore.
- (5) Disembarkation.
- (6) Operations on land. (Not to be considered.)
- (7) Re-embarkation in the presence of an enemy.

I will take each of these in turn, omitting (6), which does not concern us to-night.

For the general principles that govern the division of duties between the naval and the military authorities, I would refer you to Appendix V, Part II of F. S. Regulations.

(1) DISTRIBUTION.

As already explained, in India, the marine authorities are responsible for having everything ready as regards ships; the military authorities are responsible for the actual allotment of accommodation to definite units. But both services must work in the closest co-operation. For the procedure at Home, I would refer you again to F. S. R., Part II (54).

There are a few broad principles that have to be borne in mind. It is just as well to see what these are :—

1st.—All units should, as far as possible, be kept intact, and embarked complete with their 1st and 2nd Line Transport.

2nd.—Owing to the difficulty of getting a large number of animals on to a single ship, mounted units have usually to be broken up, but squadrons and batteries must be kept intact.

3rd.—When more than one unit has to be allotted to a ship, the accommodation should, where possible, be divided longitudinally and not transversely.

It may be also of general interest to know that all transports as well as being numbered (including their boats) are provided with blue triangular flags, pierced with the ship's number, and flown as follows :—

Cavalry on the foremast,
Artillery at the main,
Infantry on the mizzen.

In two-masted ships, for cavalry and artillery on the same mast, *i.e.*, the fore.

(2) EMBARKATION.

There is no need for us to enter into any details. The general procedure is much the same as for ordinary embarkation, except that more elaborate staff arrangements have to be made, if the embarkation is to be carried out on any large scale.

You will find the points to attend to clearly laid down in the F. S. Pocket Book, and I would also direct your attention to F. S. R., Part I (42).

Connected with embarkations, however, there are certain points of general interest, and these I propose to touch on :—

There is a distinct chain of work. This is best described by the accompanying diagram. (See diagram I.)

The ships are told off to berths, and berths formed into groups.

The troops, as they arrive, are directed to their berths, and embarked on their respective vessels.

Some of the important points to note are—

- (a) That all baggage and stores should be loaded first, then animals, then wagons and guns, and lastly, the men.
- (b) That all poles and swingle-bars of carts are securely fastened. That carts are put on board fully loaded, and that nothing which will be required on the voyage or on first landing is packed in the carts.
- (c) That carts are not loaded up to exceed 8' 6" in height, as they then become top-heavy. It is easier, too, to work out the cubic capacity if the loads are uniform.
- (d) That all water-carts are emptied before being put on board, but remember to have them filled, if possible, before landing.
- (e) Horses should not be taken on board harnessed. It is best to put all harness and saddlery in sacks, and stack them in the harness rooms.
- (f) Matting on the gangways is necessary if horses are to be walked on board.
- (g) In slinging horses, their heads must not be left loose. A double guy is useful, one end on shore, the other on deck. A horse may fall backwards, but he will never fall forwards. See that the sling is securely fastened, and blindfold timid animals. Have men to guide the horse as he is being lowered down the hatchways, and have a grass-mat for the horse to land on.
- (h) For camels much the same rules apply. Camels should be fitted with harness so that they can be secured to the deck and prevented from moving in bad weather. They require 6" of sand to kneel on. Spare sand should also be carried. (See F. S. R., India, Chap XIV.)

Time does not permit of us entering into any further detail. We must now get to sea.

(3) ORGANISATION AT SEA.

This is entirely in the hands of the naval authorities, but certain military considerations have to be taken into account.

The fleet should be divided into divisions, containing a definite military unit, such as a brigade, a division, etc.; each division (naval) should be under the charge of a naval or marine officer. When war-vessels accompany the fleet, each division would probably be led by a warship. I give you an imaginary formation at sea in the accompanying diagram II. This was a formation which was adopted at a

Staff College staff tour, on the advice of naval officers present. I merely give it as a type to illustrate subsequent remarks on landing.

A rendezvous should be fixed where the fleet would be assembled and marshalled, and similar rendezvous decided on for every two or three days ahead for the whole voyage. The object of this of course is to ensure stray or lame ducks being picked up at intervals and the fleet got together, should it by any chance become scattered or have to scatter for safety.

On the voyage the various operation orders, already referred to, would be issued. All lowering and hoisting tackle of boats would be tested, and every step taken to see that everything was in working order, and that all ranks thoroughly understood their respective rôles and duties.

(4) THE APPROACH.

A final rendezvous within easy reach of the objective would naturally have been selected. From this point, no doubt, would be carried out such feints as had been decided on, and the final advance of the fleet made, so as to arrive at the selected anchorage under cover of darkness. This would usually be necessary, as under modern conditions it is generally admitted that the covering party would have not only to be got ashore, but also, if possible, got into their covering position, before daylight, and this of course would entail a landing by night.

The landing of the covering party should be as simultaneous as possible, and the boat-power of the whole fleet utilised to ensure this.

Horses for this party should land fully saddled and harnessed, so as to move off at once, and all ranks and animals should be provided with at least two days' rations.

If the landing was early discovered and opposed, valuable support could under certain conditions be given by the covering fire of escorting warships. On this, however, it is just as well not to count, as much depends on local conditions at the time.

The accompanying diagrams roughly explain the imaginary formation at sea, and the subsequent movement to the anchorage prior to the landing taking place. (See diagrams II and III.)

(5) DISEMBARKATION.

Immediately after the covering party has gained a secure footing, the beach staff, working parties, and certain staff officers with their chargers are put ashore. Till this has been done, the real work of disembarkation cannot begin.

The organisation of the beach staff is on some such following lines :—

See diagram IV.

You will see that the beaches are controlled by naval beach masters and military landing officers. Naval and military responsibilities combined start on boardship. The naval authorities are in

entire command during the trip to the shore. On arriving at the beach responsibility is again shared by the two services, and thence it passes entirely into military charge.

The landing is worked out by stages, based on the available boat-power, the boats being told off into groups or tows working certain ships. It is most important that this should be very carefully worked out, but it is never safe to attempt to work out the movements of these tows by "timings." The only safe method is to arrange everything by stages and sequence of trips. The disembarking staff keep a close watch on these trips, and work in close co-operation. The military officer sees that all men, animals, etc., are ready as soon as tows come alongside, and the marine officer sees them put into the boats and sent off ashore, where the marine officer lands them and hands them over to the military staffs.

It is important for regimental officers to see that their men, etc., are all ready, fully equipped, water-bottles filled, reserve rations in haversacks, and so forth, as soon as they are warned to stand by for disembarkation.

As each tow approaches the shore, the boats are swung clear by the tugs or launches, and rowed the few intervening yards ashore by the crew. As soon as the boat grounds (about 3') the men step ashore and are cleared off the beaches to the "forming-up places." (See diagram IV.)

I may here point out that if men have to wade ashore for a considerable distance and have thence to push off at once inland, it is often advisable to provide them with cheap canvas shoes to wade ashore in, so that the feet may be protected and the footgear kept dry for a possible march straight away into the interior.

Provided the weather is favourable and the beach good, there is little difficulty in landing men. With animals, guns, wagons, and stores, however, it is a different matter.

At Homehorse boats have generally been employed in landing animals. These are large, flat bottom boats, 50' x 15', the ends of which let down as ramps.

In expeditions based on this country, we have had to employ all sorts and conditions of boats. Pontoons made up of water-tanks have been used, and various forms of rafts. In Somaliland *bugalows* were largely used, and in the Aden Hinterland, we used ship boats and *bugalows*. Sand was put in the bottom of the boats for the animals to stand or kneel on (camels). When near the shore these were tipped up and the animals dragged ashore. It was found that any good class of ship's boats with the thwarts taken out could hold from 4 to 9 camels. I have no data as to what a *bugalow* will hold, but from personal experience I know that a sea-going *bugalow* took a company of infantry* with a large amount of stores for a run of some 80 miles.

For expeditions based on India, it has been suggested that greater use might be made of surf boats as a substitute for horse boats

* About 70 rifles.

The Japanese at Pit-se-wo slung animals into *sampans*, a flat boat, I understand, resembling the Madras surf boat. The horses were provided with grass-shoes; and on landing at the bottom of the *sampans* were secured by posts, which were dropped into holes provided for the purpose.

Madras surf boats are 30—40' long with a beam 5' 6"; tonnage about 2 tons.

In Somaliland, animals were often landed by towing them ashore. The procedure was to put a rope round the neck with a non-slipping knot, and another rope attached to the headstall, the former for purposes of towing, the latter to keep the animal's head up. One boat towed four animals.

Another method advocated is to swim horses ashore in droves. This is difficult and unsatisfactory, no time being saved, unless isolated beaches are available where animals can be rounded up and collected.

Animals are best landed (except for the covering party, etc.,) unharnessed.

For landing guns of the type of the 4.7", strong, open rafts are required, constructed on launches or pinnaces, the thwarts and gun-wales of which have been strengthened. The gun hangs between the boats, which are 8' apart, and is kept up by a boom on the trail. Strong boats are required for such rafts.

To summarise the sequence of landing, we have then—

1. First to land the covering party (usually by night).
2. Then the beach staffs and certain staff officers.
3. Next, all first line transport of the covering party.
4. After which, the fighting troops with their first line transport.
5. Followed by all second line transport.
6. And lastly, other details, coolie corps, stores, etc.

(7) RE-EMBARKATION.

With possible land operations, as I have said, we are not concerned. We will therefore pass on at once to the question of reembarkation in the presence of an enemy. For such an operation no hard-and-fast rules can be laid down; so much will depend on the circumstances of the moment, but there are certain broad principles which it is as well to follow. These are best explained by the attached diagram IV. The main points to note are:—

1. The beach must be kept in perfect communication with the covering position.

2. The Senior S. O., with full powers, should be detailed to take command at the "place of assembly." He should keep the P. M. L. O. informed of the arrival of all troops as they come in. The M. L. O. in his turn should send up word from time to time to the above officer of his requirements, on which troops would be sent down to the "forming up" places for embarkation.

3. All impedimenta should be embarked and got rid of as early as possible. The bulk of the artillery would be the first of the

fighting troops to be embarked (but see below), then the cavalry, and finally the infantry.

4. The G. O. C. and his staff should remain to the last, that is, with the covering party, whose final retirement, under favourable conditions, could be greatly facilitated by the fire of escorting war-ships. If guns had to be left to the end with the covering party, these would probably have to be abandoned, and there should be no sentimental feeling about the subject.

Often too, in civilised warfare, the badly wounded and sick might have to be left, especially if the re-embarkation was at all pressed. Provision should be made for this.

5. Every attempt should be made to re-embark units on the ships that they came in.

This brings us to the end of our subject. I have only been able to deal with it on very broad lines. What points have struck you in connection with this question of oversea expeditions? To my mind two points stand out pre-eminently clear :—

Deductions drawn from the foregoing considerations and concluding remarks.

1. The absolute need for thorough co-operation between the sea and land services.

2. The necessity for peace practice, as a natural sequence to (1).

In India, there are few opportunities of serving near the sea, still we have a few seaports at which there are military garrisons. Obviously these stations should be our training ground.

Every endeavour should be made to get the Navy to co-operate and to obtain the services of officers of the R. N. and the R. I. M. at staff tours and manœuvres. This has been done and is being done, but we labour under two great difficulties :—

First, as regards obtaining the services of either R. N. or R. I. M. officers, who are not numerous, and who are fully occupied for the greater part of the year, especially in the cold weather when we carry out our training; and secondly, as regards funds. The spirit indeed is often willing, but the funds available cannot often be turned to such use.

Manœuvres of this type to be really practical are very expensive, and this alone limits the occasions on which such operations can be practised. We can, however, do a great deal by modified practices of the type carried out by our own Division (VIth) last year at Poona. The ideal, of course, should be our aim, but often that which in theory appears excellent has in practice to be modified to suit existing conditions. Still I think much can be done in this line even in company training. Minor exercises could be practised, various experiments tried (if the opportunity presents itself), and possibly valuable data obtained. As I have already pointed out, we need more data, and this can only be obtained by experiment, and officers must not be diffident in sending in reports, under the impression that it is probably of little value. It is from the sum total of experiments that correct deductions are drawn, and we need all the

information we can get to verify, modify, or change existing ideas on the subject.

The ideal would be to carry out systematic experiments on various points at our seaport stations, and there thoroughly to train and practise all garrisons in the vicinity, in oversea embarkation and disembarkation duties, especially units of the Indian Army, who seldom have much to do with the sea, and who enlist men, the bulk of whom have never even seen the sea in their lives till they come down to one of our seaports. I need hardly point out that troops thus trained would be invaluable as units of, say, the covering force, whose duties are difficult and arduous, and who have such an important rôle to play, on which so much depends. Troops thus trained might be earmarked as the first to be selected for oversea expeditions, and this would be a great incentive to perfect themselves in such duties. How far this is practical is another question. I merely put it up for consideration.

F. S. R., Part I (2) tells us that: "The correct application of principles to circumstances is the outcome of sound military knowledge built up on STUDY and PRACTICE until it become an INSTINCT." We are a Sea Power, and as in the past so in the future, will India sooner or later be called on once more to send forth an oversea force. Past experiences we can study, but to cultivate the necessary "instinct," we must have practice, so that when we find ourselves "at sea" in one sense, we will not be "at sea" in the other meaning of the word.

At the discussion that followed, Commander Huddleston, R.I.M., gave some interesting and valuable notes from his own personal experiences in China and in Somaliland.

Discussion at conclusion of the lecture.

He spoke in warm terms of the value of the surf boat under the conditions under which landings had to be carried out on certain portions of the Somali coast. These boats had to be requisitioned from Madras, and the ordinary type of boat was found unsuitable. He pointed out the necessity for thoroughly studying local conditions and making adequate arrangements as regards the nature and number of boats likely to be required. Neglect to see to this only results in additional expenses and delay, which might under certain conditions lead to a regrettable incident if not disaster.

He touched on various points connected with the taking up and fitting of ships. In pointing out the necessity to have sufficient height 'tween decks for camels, he gave an example of the difficulties they had experienced in this very matter on a certain occasion, and explained how they had got round the difficulty by making the camels kneel down on the tops of mess tables and dragging them in thus seated, 'tween decks.

Brigadier-General Barter, in summing up the subject, pointed out the great difficulties of carrying out a re-embarkation when hotly pressed by an enterprising enemy, and in connection with this reminded all present of the famous Corunna.

DIAGRAM I.

DIVISION OF EMBARKATION DUTIES.

Naval.

+

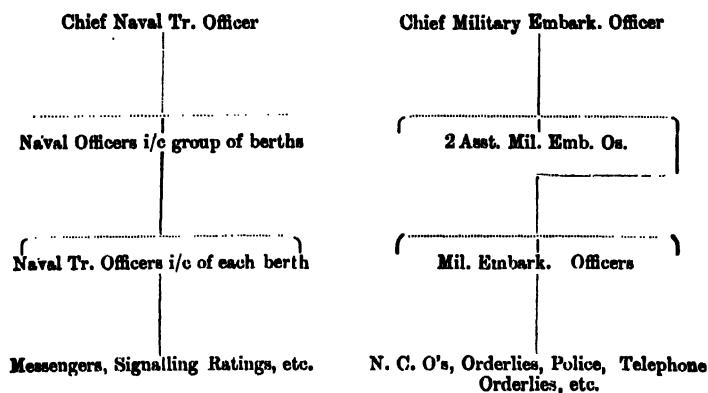
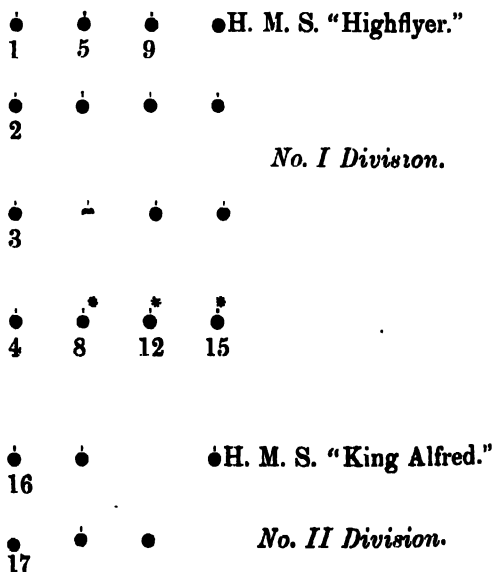
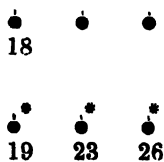
Military.

DIAGRAM II.

AN IMAGINARY FORMATION AT SEA

For a Fleet of Transports

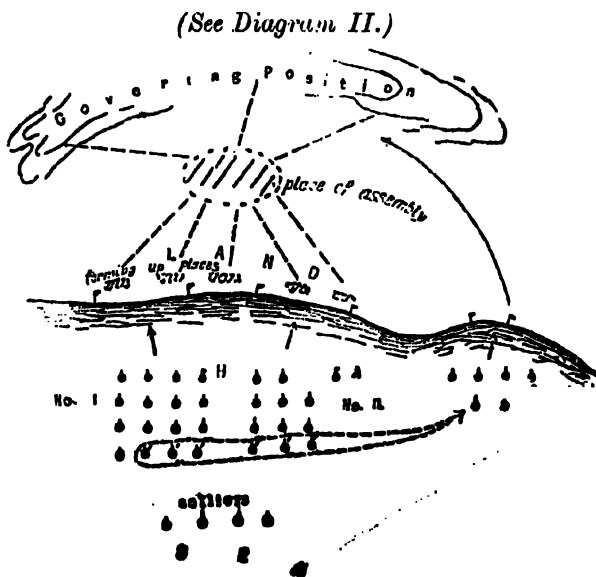
No. II Division—(contd.)

• • • • *III Colliers*

Note.—• ships marked thus carry the covering party—see Diagram III.

DIAGRAM III.

DIAGRAM TO ILLUSTRATE THE APPROACH AND THE LANDING OF THE COVERING PARTY.



LESSONS TO BE LEARNT FROM THE SIEGE OF PORT ARTHUR AS REGARDS R. E. WORK.

BY MAJOR C. B. COLLINS, R.E.

The Siege of Port Arthur exemplified most, if not all the lessons which have been inculcated in the recognised text-books on the subject of sieges for very many years.

It is only proposed to notice these briefly, and then turn to some features which, though not perhaps novel, yet exemplify the changes necessitated in accepted theory by the advance of modern science as applied to the art of war. Finally, a few observations will be made on possible future developments in the art of the attack and defence of fortresses.

Part I will thus consist of the enumeration of recognised principles giving brief references to instances at Port Arthur.

Part II will treat of the practical extension of some of these principles.

Part III will deal with possible future developments.

PART I.

(1) *The necessity, (for a successful defence), of the provision of permanent works.* The semi-permanent works at Port Arthur succumbed comparatively easily to a determined assault, and can in no case be relied upon to keep out a superior enemy; thus, for instance, 203 Metre Hill which proved the key to the position, fell before determined assaults.

(2) *Guns and howitzers, if placed inside permanent works, should be mounted in cupolas sufficiently strong to resist the attacking artillery, otherwise they are better placed outside and behind the intervals of the works. Such positions should be well screened, and protected, and use made only of indirect fire.* All the guns mounted in forts were destroyed by bombardment sooner or later, whereas a howitzer battery which did great execution was never located till the capture of 203 Metre Hill enabled it to be taken in reverse.

(3) *Good communications well protected.* These are indispensable both for attackers and besieged, and light railways are practically a necessity. There were no protected communications to 203 Metre Hill, and in the last assault the Japanese directed their fire on the ground in rear of the trenches and thus prevented supports from coming up.

(4) *Mutual flanking fire between the various forts of the defence, and the absence of any dead ground near to or between the various works.* This will be touched on in Part II.

(5) *The necessity for deep ditches and flanking fire to protect them.* Ditches checked the Japanese attack in nearly all cases from one to two months from the time they obtained a footing on the glacis.

(6) *The great use of efficient obstacles.*

(7) *The necessity for counter-approaches to permit of vigorous counter-attacks.* The absence of these prevented any but very small and local counter-attacks on the part of the Russians.

(8) *The use of open gorges to prevent an enemy making use of a work if captured.* This is rather debatable and applies principally to advanced works.

(9) *The great use of machine guns in the defence.* These might almost form the sole armament of the permanent forts.

(10) *The necessity for good bombproof cover for the garrison and covered exits therefrom to the parapets, escarp and counter-scarp galleries, etc.* The Russians lost many men by shell fire when leaving the casemates to man the parapets.

(11) *The necessity for ample and well protected magazines.*

(12) *Efficient head cover for the defenders.* Infantry parapets without headcover were untenable owing to the intensity of the fire.

(13) *The necessity for attacking permanent works by trench work and mining.* No single permanent work with a ditch was carried by assault without previous mining.

(14) *The necessity for powerful howitzers instead of high velocity guns in the attack of a fortress.*

(15) *The necessity of well screened artillery positions.* These as well as the advance by trench work will have to be constructed almost entirely by night. Of a Japanese battery of four guns, two were discovered and drew all the Russian fire, whereas the other two were never molested.

(16) *The importance of good methods of transmitting intelligence—either telephones, telegraphs or by visual signalling.*

All these points have been well understood in the past by all writers on fortress warfare and have only gained additional weight from the experiences of Port Arthur.

PART II.

SOME SPECIAL DEDUCTIONS AND LESSONS DIRECTLY ATTRIBUTABLE TO THE ADVANCE IN MODERN SCIENCE:—

(1) *Modifications in fortress warfare necessitated by the increased range, accuracy, and power of modern artillery.*

(a) *Siting of the main line of defence with respect to the vital point to be protected.* At Port Arthur the vital point to be protected was the fleet in the harbour. At the very commencement the Japanese siege batteries were in easy range of the harbour, but no great damage could be done, as they had no points of observation from which to direct the fire. As soon as 203 Metre Hill was

captured, from which the harbour could be seen, the fleet was destroyed. After that the only reasons for holding out were prestige, and the preventing of the besieging army from joining the Japanese field army.

But it is scarcely safe to draw the general conclusion from this example, that forts should always be so located as to prevent the hostile fire from reaching the main point to be defended. This would mean that the main line of defence would have to be at least six to seven miles from the vital point, for modern guns and howitzers can come into action at 10,000 to 13,000 yards. These ranges were used by the Japanese howitzers. In many fortresses the vital point to be defended is the defending army itself; for instance, in the case of forts which form a *point d'appui* for the field army, or it may be a town on an important line of communications. In such cases, bombardment has little except moral effect, and the besiegers will not waste an enormous amount of ammunition for moral effect only. So in designing the defences of a fortress, it is necessary to consider *first*, the nature of the vital point to be defended; *second*, the garrison likely to be available; *third*, the amount of resistance required and the probability of the fort being relieved; all of which may be summed up in the phrase, the strategic value of the fortress.

If the fortification of Port Arthur had not been very incomplete and in some cases unwisely sited, it could no doubt have held out till the Russians' European fleet arrived, and would have fulfilled its strategic purpose. It therefore appears that the line of defence selected was perhaps the best possible, though this opinion is not concurred in by many critics.

(b) *The usefulness of advanced positions and posts.*—The occupation of advanced positions, if the flanks are secure, may delay the enemy considerably. The Japanese took the Nanshan position north of Dalny on 26th May, whereas the regular siege of Port Arthur did not commence till 31st July, a delay of over two months. The construction of advanced posts and trenches seems, on the whole, to be objectionable, as such trenches or redoubts generally give the enemy cover from which to advance to the next phase of the attack, but there were one or two instances in the siege of Port Arthur where trenches out on the flank of the forts were of considerable value and were useless to the Japanese when captured, *e.g.*, the advanced trench of East Kirwan Fort and a trench in the vicinity of 203 Metre Hill which proved a veritable death-trap to the Japanese troops.

(c) *The usefulness of 2nd and 3rd lines of defence, and a central keep.*—The utility of these depend entirely on whether it is desired to hold out to the very end, with the object of containing the besieging force as long as possible or denying to the enemy an important line of communication. Considering the increased power of artillery, and the fact that the main position is almost certainly the strongest available, and within fairly close range of the 2nd position, it is probable that money and labour spent on the 2nd

or 3rd line would have been employed to better advantage on strengthening the main position. The Russians' 2nd line, consisting of the old Chinese Wall, was very weak, and the fortress capitulated before it was attacked. Should a keep be considered advisable, it would have to be extremely strong and be armed with powerful guns in cupolas in order to be able to make any resistance of value.

(d) *The distance apart of forts in the main line of defence.*—This indirectly is mainly affected by the increased power of heavy artillery. It is an axiom that the front of every fort should be swept by flanking fire. But as it is no longer possible or desirable to place heavy guns in the fort (see Item 2, Part I) then the flanking fire of forts consists solely of rifle fire, or at most field gun and machine gun fire. Therefore it would seem to follow that forts should be placed much closer together than before, as much flanking fire is not really effective beyond, at most, 1,000 yards. It would probably, however, be impossible, from the point of view of cost and the nature of the ground, to erect permanent forts at such close distances along the whole line of the main defence. Therefore the conclusion seems to be that permanent forts should be so close together that the enemy cannot pierce through in between them, and that flanking fire should be obtained from open works of lighter design, placed in the intervals and slightly retired so that the enemy cannot attack them without also attacking the forts on either side, and cannot hold them until one of the adjacent forts is captured. The artillery positions should be so chosen that, in addition to shelling the attackers' batteries, they can bring a cross fire to bear on the ground immediately in front of the forts in their vicinity.

(2)—*Bombproof cover.*

The cover provided in many cases in the Russian forts was found insufficient to resist the 11" Japanese howitzer. Five foot of concrete covered by five foot of earth was found, however, capable of withstanding even a prolonged bombardment. In future designs nothing less than this should be given, but it will very seldom be possible to arrange conveniently for ten-foot thickness of roof over casemates, without unduly sinking the latter and making drainage and ventilation most difficult to provide for. Probably it will be better in future to make composite roofs of concrete and iron. Thin sheets of iron under concrete have been found to give increased resistance altogether out of proportion to the thickness of the iron, and probably it would be found that the total thickness required could be reduced to five feet, by a judicious arrangement of concrete and iron sheets, without adding prohibitively to the cost. If the exposed surface is concrete, then it should be curved in such a direction that the shell may strike it an acute angle and glance off.

The Russians also suffered considerable losses by their failure to provide covered ways from the bomb proof casemates to the parapets.

(3)—*Invisibility and use of indirect fire.*

So terrible were the effects of artillery fire, that, as the siege progressed, both sides were constrained to employ indirect fire and to rely more on invisibility than earthworks for protection.

It may be remarked that it is nearly always possible to see a very large shell coming, and take cover till it has exploded, but if a bombardment is really heavy, this is not always possible. This is an additional argument for concentrated continuous fire for short periods, as against a desultory bombardment lasting many hours, and it is noticeable that in the later stages of the siege the former was always resorted to by the Japanese. The increased range of heavy artillery enables fire to be more easily concentrated on any given objective without moving the batteries. Guns on one flank of an attack can bring an enfilade indirect fire to bear on an objective on the other flank even if as much as five miles distant. The question of invisibility is referred to again in Part III under the head of Balloons and Airships.

(4)—*Increased strength of gun platforms.*

The 11" howitzers had to be mounted on concrete platforms, as wooden ones which suffice for guns of smaller calibre were too frail. The Japanese allowed the concrete to set for fourteen days which would seem to be a minimum. It is apparent, therefore, that guns of this calibre can scarcely be moved to different positions during the progress of a siege, and should be sited in the first instance at their most efficient range from their probable objectives.

(5)—*The increased size and power of ordnance.*

The increased size and power of ordnance likely to be used in future sieges necessitates a corresponding increase of weight in the ammunition that has to be transported. Light railways would therefore seem to be an absolute necessity, both for attack and defence. In difficult country motor or steam tractors might be employed very advantageously, but in this case the besiegers would have to be prepared for a considerable amount of road-making. Also large magazines must be provided, both for main and expense magazines.

(6)—*Employment of light guns in the attack.*

In spite of the increased efficiency of rifles and machine guns, it is curious to note at what short ranges field guns and howitzers came into action during the later stages of the attack. They were frequently used at 1,000 yards range, and one howitzer battery actually opened fire at 450 yards range during the final assault. The explanation must be found in the fact that such was the overwhelming nature of the bombardment, that the defenders were quite unable to man the parapets to return the fire, and that when the assault was actually launched and the bombardment had to stop, the defenders' whole attention had perforce to be devoted to repelling the assaulting columns. Some of these batteries were probably also

employed sweeping the ground behind the forts attacked, to prevent the enemy being reinforced, and were not used against the fort itself.

(7)—*Electricity in fortress warfare.*

(a) *Electric lights in attack and defence.* It is believed that the Japanese only used two searchlights, and these were concentrated beams. They had no specially designed field apparatus, and probably thought it not worth while to take the lights from any of their ships. So there is very little to be learnt from this siege about the tactical employment of electric lights in the attack. The Russians, however, took the searchlights off the ships in harbour, and in the earlier stages of the siege, when the Japanese attempted to carry forts by direct assault, these lights were most effective, the Japanese suffering enormous losses.

Electric lights even in the open are much harder to put out of action than is commonly supposed, owing to the great difficulty in finding the range and the small target they present. Also, it is difficult to lay sights on them accurately, especially if the firer is in the beam of light. The following points may be noted as exemplified by the employment of lights in this siege, and the subject will be discussed further in Part III.

Lights should not be in the forts, but on flanks and capable of movement. If in the fort, of which the range is always known accurately, they are subjected to such a tremendous bombardment, that they must be put out of action before the assault commences. Even if in casemates, showing through a narrow embrasure, it is probable that rifle fire would sooner or later be effective. Possibly one or two widely dispersing beams might be so sited and kept protected by strong steel shutters till the final moment of the assault and then disclosed, but, as a rule, lights should be outside the forts. To be effective lights must be used as dispersed beams, illuminating a wide area. Concentrated beams light up such a small area of ground that they are of little use in helping the fire of the defence. Such concentrated lights, however, have some value in detecting the initial movements of the enemy, at long ranges up to perhaps 3,000 yards on clear nights.

In mist or fog electric lights are practically useless for ranges over 300 to 500 yards.

(b) *Electricity for general purposes.*—No mention is made as to whether the Russians used the electric light in any cases for the lighting of casemates, magazines, etc. Probably they had no power available after providing for the few searchlights which they employed. Still less could they have used it for electric ammunition hoists or electric traction, but in fortresses where power is available, no illuminant could be better for casemates, where ventilation is extremely difficult to manage, and its special suitability for the lighting of magazines is undisputed.

(c) *Electric lights in the defence of the harbour.*—The Russians had very few, and these were mounted too high up on the cliffs to be

really efficient. The main principles of the use of electric lights for the defence of a harbour are that a certain area *must be* completely illuminated by several fixed dispersed beams and a powerful armament of Q. F. guns directed on this illuminated area. Slightly in advance of this area powerful concentrated lights should be sited, so as to sweep the whole approach and discover any approaching vessels—but attacking vessels can only be destroyed by gunfire with any certainty in the illuminated area, which should be so large that even fast torpedo boats will take many minutes to cross it. No new lessons as to the employment of harbour defence electric lights could be learnt from the history of the siege.

(8)—*Hand grenades.*

(a) Instruction in the use of hand grenades had been practically discontinued in our service since about 1890. The writer remembers being taught a regular drill for throwing hand grenades at Chatham a year or two before that date, which was designed to ensure the bomb bursting almost at once on reaching the ground. If thrown too hurriedly after lighting the fuse, the enemy had perhaps time to pick it up and throw it back before it burst. The importance of this was exemplified in several instances in the siege of Port Arthur; one writer stating that an assaulting squad threw its grenades and then charged at once, with the result that the bursting of the grenades occurred after the assaulters had reached the trench, and killed many of the throwers.

Iron and steel canisters with a high explosive were used on both sides and the Japanese even used short lengths of bamboo cane.

There is no doubt that a good type of hand grenade should be manufactured and kept in stock for the requirements of a possible siege. Hostile trenches will often be only a few yards apart in the final stages of an attack, and hand grenades are most useful in underground warfare, or in repelling the actual assault over or through a breach.

(b) Bomb mortars may be said to have been invented at the siege of Port Arthur. Ordinary artillery and even rifle fire is almost useless at very short ranges against troops with good head cover. The Japanese made wooden mortars strengthened by iron bands and throwing small shells of high explosive up to a range of about 450 yards. Such shells against entrenchments were very effective if accurately placed, but the mortars were so hastily designed, that the actual effects were not very great. This will be alluded to again in Part III.

(9)—*Fougasses, mines, and countermines.*

Fougasses were used fairly extensively by the Russians, but their effect was small. Sometimes they were exploded at the wrong time, and even when correctly timed the effect was more moral than material, and they seldom had any decisive influence in repelling an attack. The craters formed by the explosion moreover formed subsequently a useful lodgment for the attackers.

Mines—The Japanese used mines on many occasions to blow down the escarp wall and so open a way into the fort they were attacking. They were, however, not very experienced in calculating charges or in estimating the probable effect of the explosion. In one instance at Erlungshan Fort the assaulting party was drawn up in the parallel above the counterscarp and were so buried in *debris* from the explosion that many men were killed and a fresh party had to be brought up. The Russians also did not make nearly enough use of countermines; one at least fired prematurely, and in many instances countermines were not used at all. Mining will be an essential feature of all future sieges and must be met by countermining. The great lesson to be learnt is that this art must be practised in peace time, or else an immense amount of labour may easily be wasted and very serious mistakes made. This subject is dealt with again in Part III.

(10)—*Sanitation.*

This is possibly more a subject for Medical Officers than the Royal Engineers. Still the latter officers must have a sound idea of the leading principles and applications of sanitary science. The Japanese appear to have neglected sanitation in the earlier stages of the siege. In August they had 10,000 sick, whereas in September this number fell to 5,000, and later on to very considerably less, partly due no doubt to the cool weather.

Eye-witnesses, however, describe the sanitary arrangements of camps and trenches as very primitive, at the beginning, whereas later the trenches are described as very clean and well kept in this respect.

The Russian casemates were said to be very badly designed and ill-ventilated, and they lost a very large number of men by disease.

It is specially necessary that all forts, whether permanent or semi-permanent, should be well drained. This must be arranged for in the design and executed at the very beginning, otherwise it is a very difficult and costly matter to get rid of storm water. The drainage of trenches is also of great importance in siege warfare, when they may have to be occupied for months. A little care in the original alignment and design is necessary to ensure this, and this is distinctly the duty of the Field Engineer.

Casemates must be well ventilated, and in permanent works this is best done by upshafts with a revolving cowl on the top.

Unless a drainage system is feasible, latrines should be situated on the outside of permanent forts. These can be used till the attack reaches close range, provided they and the communications to them are protected from artillery fire; but when a work is closely invested arrangements must be made inside the fort itself.

Similarly a latrine trench well protected from fire should be constructed at intervals alongside a trench which has to be occupied for long periods. It is very inadvisable that men should have to go any considerable distance to the rear to attend to calls of nature, for many will be in no hurry to return to their post, if attacked.

A good water-supply to permanent forts is essential, and if no piped supply is possible, tanks should be well protected from hostile fire and be large enough to contain three months' supply at the least.

(11)—*Wireless telegraphy.*

The Russians in Port Arthur were able to communicate with the main land of China by wireless telegraphy, but this had no important bearing on the defence except that they were occasionally able to get supplies and stores in small quantities by blockade runners. It might, however, on occasions prove of great importance, and every fortress should have an efficient installation. It is not stated if the Japanese land forces used it in any way, but probably this was their most rapid means of communicating with their fleet.

(12)—*Obstacles.*

The only novel form of scientific obstacle tried at Port Arthur was an electric fence. It was not a success, as the defenders seem to have been more afraid of it than the attackers. It was easily destroyed by grapnels. Another novelty consisted in planks thickly studded with spikes and nails, and firmly anchored to the parapets. This proved very efficient. Wire entanglements were used freely, mostly of plain, not barbed wire, but the posts were of wood and not driven firmly enough into the ground. Still they proved exceedingly useful against a sudden rush, and were only destroyed at considerable trouble and expenditure of lives.

PART III.

(1)—*Suggestions on the tactical defence of a fortress.*

The very word "siege," that is, the attack and defence of a fortified place, presupposes a decided superiority on the part of the attackers over the defenders, either in numbers, equipment, or *moral*, and probably in all three. The function of fortifications is to redress this adverse balance, and to place the defenders on an equality with the enemy. But it must be remembered that the attackers are able to bring up reinforcements and stores of all sorts, and to replenish their ammunition, whereas every casualty among the defenders reduces their numbers, every round fired depletes their stock of ammunition, every ration eaten reduces their food-supply, and every yard of ground lost probably lowers their *moral*. It is for this reason that a siege vigorously prosecuted is generally successful in the long run, though there are many instances in history in which a fortified place has held out as long as was necessary. In every department of siege warfare, except one, the attackers must almost of necessity be in a superiority, and that exception is in mining or subterranean warfare.

In shafts and galleries only a few feet square, the defence can bring as many men into action as the attack. If they have been practised beforehand in this sort of warfare, they should indeed be

superior, and it seems that, in forcing the enemy to resort to mining, the defence deprives the attacker of all his superiority, and meets him with the chances in his favour. The defender possesses one great advantage, and that is, that he can resort freely to explosions to destroy the enemy and his galleries, whereas the attacker cannot do so, for every explosion delays his own advance and eventually makes the ground impossible for mining.

This consideration alone should have a great effect on the *moral* of the opposing troops in subterranean warfare. But it is of no use to allow the attacker to reach the main ditch before he commences mining, as happened at Port Arthur, for in that case any explosion affects the escarp wall, and permits of an assault above ground, where the attacker can make use of his superiority of numbers and artillery. Following this chain of reasoning, it appears that the attacker should be forced to resort to mines at least 200 yards from the escarp wall, and it seems possible to make him do so in two ways. First, by the development of bomb mortars used in conjunction with electric lights. There appears to be no reason why mortars should not be designed to throw a very large shell of high explosive, accurately and descending at a very steep angle, on to the head of the approaching sap at ranges up to perhaps 400 yards. Such mortars could be placed in the ditches of works, or in specially prepared deep emplacements a little behind and on the flank of the fort itself. If such a mortar could be designed (and it might well be pneumatic according to the design of the famous American coast defence dynamite gun) sapping and the digging of parallels within 400 yards of the fort would become impossible. Of course, it would be necessary to use these mortars with electric lights, as trench work is always performed at night.

If such a mortar be impossible to invent, then the enemy must be forced to cease his advance above ground by an elaborate system of countermine galleries carefully prepared beforehand, and in any case such a system seems to be a necessity of siege warfare.

From either flank of, and from the middle of, the front face, galleries should be made below ground leading from the ditch at least 100 yards, if possible, under the glacis, the outer ones diverging somewhat to the flanks. At 100 yards distance these galleries should be joined by a gallery roughly paralld to the front of the fort, and from this gallery very short galleries might be pushed out at intervals of a few yards towards the enemy. If it were impossible to stop the enemy's sapping as suggested in the preceding paragraph, then his sap head could be blown up when it reached the outer gallery. If the explosion formed a deep crater, it would be of little use to him, for he could scarcely make use of it, or continue his sapping with the knowledge that he could be blown into the air again at any minute. He would then be obliged to resort to attacking the countermine galleries by mining, and all the advantage would then be on the side of the defence. In underground warfare the defenders should take a vigorous offensive,

exploding mines freely whenever they come across the enemy's galleries, and, as soon a mine is exploded, making a gallery alongside it to meet him if he succeeds in getting through the broken ground. The underground warfare should thus be confined to the neighbourhood of the front gallery 100 yards from the fort, and after a time the soil would be so loose and shaken that mining through it would almost become an impossibility.

The main galleries described above, having been prepared during the building of the fort, might well be made high enough for a man to walk upright; but the sapper garrison of the fortress should be practised in mining work in peace time, and might well construct a second gallery parallel to the front of the fort, and from 20 to 30 yards in rear of the front gallery, for use as a second line of defence in case through carelessness the first was accidentally rushed. To guard against such an occurrence strong steel loopholed shields could be made to fit the gallery, and placed ready at intervals, so that they could easily be slid from one side, or allowed to drop into place across the gallery. If electric lights were available, the galleries could be lit by lights placed in recesses in the roof. Small shafts could be taken up to the open air at one or two places in the radial galleries, which would ensure ventilation and might even be used as manholes, from which to observe and locate the approach of the enemy's sap. It might be necessary, also, to construct a gallery out to one flank, if for any reason such as dead ground the enemy's approach might be apprehended from that quarter.

It may be urged that the construction of such galleries would be too costly, but if the fortress is of vital importance, then the expenditure of a little money to make it invulnerable is justified. If Port Arthur had been able to hold out till the arrival of the Russians' European fleet, and the two fleets combined had then proved superior to the Japanese fleet and gained the command of the sea, the history of the world would have been entirely changed and Japan's progress into a first rate power indefinitely retarded.

To reduce expense, the countermining galleries might only, in the first instance, be constructed to a radius of 50 yards, and the outer circle added slowly, as a training for the sappers in time of peace.

This system necessitates the storage of a very considerable amount of explosive, but it might well be placed in small magazines in the counterscarp wall, and exploded as mines if the attack succeeded in reaching there.

If this train of argument, *viz.*, the necessity for the extended use of countermines in the defence, is admitted and carried to its logical conclusion, it would almost seem possible to dispense with the deep ditch in permanent works; but apparently it would never be safe to do without with such a ditch, for the all-important reason that no other obstacle can be absolutely relied on to prevent a fort being rushed in the earlier stages of the attack. Add to this a ditch is very useful for many reasons. It might well be the place where the powerful mortars of the defence could be placed. It is also a

convenient place from which to start the countermine galleries, and there seems to be no reason why some of the troops of the defence should not live in lightly constructed shelters built against the counterscarp walls, where they would be quite safe from shell fire and more comfortable than in bombproof casemates. Such shelters could easily be removed before the enemy's attack reached the counterscarp wall.

To sum up, the great lesson to be learnt from the siege of Port Arthur is that, if an enemy is once allowed to obtain a lodgement on the glacis over the counterscarp wall, it is only a question of time before the fort is taken. The ditch may be defended by caponiers, and these are obviously preferable to the counterscarp galleries, but nothing can prevent the escarp wall being blown up and the fort assaulted by superior numbers.

Even a system of countermines under the ditch would not prevent this, for any explosion of a mine there would itself injure the escarp wall and make the attacker's task easier rather than harder.

As a corollary to this, there would then seem to be no reason why the counterscarp should not be crowned by an infantry trench with head cover, thus giving two tiers of fire, the loopholes in the main parapet being so arranged that the rifles of the defenders could not be depressed to fire into the troops in front, but the loopholes could be made capable of alteration at short notice, in case the counterscarp trench were occupied by the enemy. Such a loophole would not be very difficult to devise.

(2)—*The development of electric searchlights.*

It is unfortunate that searchlights were so little used by either side at Port Arthur, as practical use in war is the only real test of new inventions. But in our service considerable progress has been made in perfecting searchlights for use in the field, and they should play a large part in future operations, especially in field warfare. As has been said in Part II, experience has shown that lights should be used as dispersed beams. The horizontal dispersion is effected in two ways, either by fitting on to the front of a projector a glass dispersing lens consisting of a number of prisms, or by using a reflector, a section of which in the horizontal plane is an ellipse and in the vertical plane a parabola. Ordinary parabolic reflectors giving a concentrated beam can be satisfactorily made of metal, faced with palladium, but so far it has been found impossible to make a parabola ellipse reflector of anything but glass.

A light therefore giving a dispersed beam is exceedingly vulnerable, as one rifle bullet will shatter either the glass lens or the glass reflector, but a metallic reflector can be hit frequently without the intensity of the light being much effected. Doubtless a satisfactory metallic parabola ellipse reflector will shortly be obtained and then the light will be extremely difficult to put out of action.

Projectors for field use are now in our service fitted with bullet-proof shields protecting everything but the reflector and the

top of the lamp itself, the latter of which can quickly be changed if damaged. The lamp is automatic, so that the detachment can take cover in low trenches close by, and even manipulate the direction of a light from a distance by motor traversing and elevating gears. With these improvements electric lights should play a very important part in future warfare, as they have been made very light and portable. To prevent the enemy finding the range, the lights should be so sited that the beam does not light up any ground immediately in front of it. Subject to this condition, the lower the light is placed the better, for then it lights up a larger area of ground in depth. As rifle fire will probably prove ineffective against lights, except at very short range, the best method of destroying them would possibly be by pompoms or similar guns used with a concentrated electric light at medium range. The concentrated beam would light up the projector and the ground near it, and the range could be determined by the puffs of smoke of the bursting shells. A pompom shell bursting in or on the projector would probably put the light out of action for a considerable time. The value of lights in connection with improved mortars has been mentioned in Part III (1), and they would also be invaluable in assisting to repel any assault by night.

In their reports of the Bazar Valley and Mohmand expeditions, R. E. officers were unanimous in pointing out how very valuable some electric lights would have been in the defence of exposed outposts and in ensuring the security of camps at night. It appears that the experimental lights at Aldershot have already reached such a stage of perfection in mobility and efficiency that some might well be assigned to the frontier divisions for trial in manœuvres in peace time, and on the next frontier expedition. The personnel required is small, and most useful knowledge would be gained to indicate the best line to follow in future experiments.

(3)—*Motors and mechanical appliances.*

Motor traction is daily being more and more used in modern armies. No mention is made of motor waggons, etc., having been used by the Japanese, but in future sieges they should prove invaluable in distributing supplies and ammunition from rail head to the different units. Types have already been designed, which will go across ordinary country, so rough roads only would have to be constructed if the country was difficult. They would prove far more handy than light railways, though the latter would probably still be necessary for the main communication to the base, and also for the heavy batteries.

Mechanical drills for mining were apparently not used; all the mining was done by the ordinary pick and shovel. As the soil was very hard, a good mechanical drill would probably have saved an immense amount of trouble, but no satisfactory machine yet appears to have been invented.

(4)—*Balloons and flying machines.*

The influence of these on the warfare of the future can scarcely yet be accurately estimated. If the Japanese had been able to direct

their heavy howitzer fire on the ships in the harbour by means of an observer in a balloon or flying machine, the prosecution of the siege to its bitter end would have been unnecessary. Again, if the Russians had been able to locate the heavy siege batteries, the latter would have been quickly put out of action, or else the Japanese would have been forced to build substantial cover for them—a task of the greatest difficulty.

It appears that invisibility will be an impossibility in the siege warfare of the future, if both sides are in possession of dirigible balloons or efficient flying machines, and the side that does not possess them will be at such a disadvantage as to make success practically impossible. Whether balloons or flying machines will have any value as offensive weapons is extremely doubtful, for they are not likely to be able to carry any useful amount of explosive or to drop it accurately from the height at which they would have to remain to be immune from fire.

A discussion at the present moment as to the relative merits of dirigible balloons and flying machines would be unprofitable, as they have not yet reached a sufficiently advanced stage. The same remark applies to the question as to whether they will be able to take offensive action against each other, in which case the battle in the air might have to be decided before the land battle commenced; but there seems to be no doubt already of their utility for purposes of observation, and the combatant who possesses them should, in the wars of the future, have an immense advantage over an opponent who does not.

Supposing that, in the future, invisibility in the siting of guns is unattainable by reason of the use of balloons, the theory that is now almost universally expressed that heavy guns should not be placed in the forts may have to be modified. If heavy guns can always be located, and fire directed on them, then it will be necessary in the fortress of the future so to protect the heavy armament that it cannot be destroyed by hostile fire. This means that guns must be mounted in steel cupolas, and if so, they might well be in the forts, or at any rate on the most commanding heights obtainable.

(5)—*Submarine boats.*

This is not a weapon with which the R. E. has to deal, but it is mentioned here, because of the great effect it will have on the warfare of the future in the case of naval fortresses like Port Arthur. It is not putting the case too strongly to say that the bombardment or even the efficient blockade of a harbour containing submarine boats will be an impossibility.

The sea forts of Port Arthur were never attacked, such bombardment as was attempted by the Japanese fleet being directed on the Russian ships in the harbour; but sea forts to resist an attack by an enemy's fleet will be rendered totally unnecessary by the presence of a flotilla of efficient submarine boats. All that such a naval fortress of the future will have to guard against will be an attack by hostile torpedo boats, and also by hostile submarine boats. The

defence against the former has been dealt with in Part II 7 (c) and the defence against the latter is essentially a naval question which need not be discussed here.

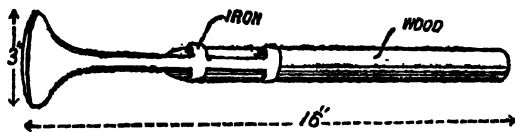
An enemy might also attempt to land and rush some position of the defences, in order to secure a foot-hold or destroy advanced guns or lights ; but this procedure is unlikely, and can be guarded against by a well-built battery on the flank of the defences, surrounded by a deep ditch.

CONCLUSION.

It is recognised that many of the opinions and arguments set down in this essay are open to criticism, but they are submitted for what they may be worth, and may perhaps form the subject of useful discussion.

A CAVALRY ENTRENCHING TOOL.

BY MAJOR E. M. J. MOLYNEUX, D.S.O.



I am aware that to many cavalry officers an entrenching tool is "*ἀνάθεμα μαρὰν ἀθά*":—I hasten, therefore, to explain that the many subsidiary uses to which this little implement can be put more than justify its inclusion in the kit of the cavalry soldier on field service.

To begin with, it lessens the load on the horse both in weight and bulk, by enabling picketting pegs to be entirely abolished. No picketting pegs for either horses or mules are in use in the Patiala Imperial Service Lancers, where each man has been provided with one of these tools; and I have found, during the use of these implements extending over a year and including a camp-of-exercise, that no horse or mule picketted in this manner has ever got loose. It enables a great deal of lightening of equipment in the way of mallets and line gear. It is equally efficacious in hard or in loose sandy soil, where it is difficult to make any peg hold. I noticed, on a camp-of-exercise this year, that one cavalry regiment using the old method was employing four pack horses to carry mallets and picketting gear, which are not required if this implement be carried.

It saves a great deal of expense to the men. A set of pegs, in the Punjab, costs from eleven to fourteen annas per man; and the pegs are constantly breaking and getting lost. These implements (the local name for them in the Punjab is "*Gundála*") were made up regimentally for the Patiala Lancers at one and a quarter annas per man. So far none have broken or become unserviceable. The method is not new, having been used for very many years by trans-frontier horse dealers for picketting their animals.

It saves a great deal of time in picketting. No man has to wait for a mallet, and the horse can be picketted more rapidly in ordinary soil by this method than he can by means of pegs and mallets, even if a mallet be carried by every man.

The manner of using the implement for picketting is quite simple. A narrow hole is dug in the ground, usually not more than 9 to 12 inches deep. It should, if possible, be narrower at the top than at the bottom. The end of the rope to be buried is knotted, or, better still, tied round a brick or stone, or a bunch of grass or sticks, and is then buried in the ground. The earth is then

stamped in on top of the knot with the heel of the boot. A straight pull up (as in Fig. A) will at once loosen the rope, but if the pull be along the ground—as a horse has to pull at his fore and hind foot picketting ropes—it is perfectly secure (Fig. B).

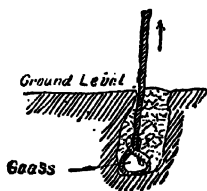


Fig. A.



Fig. B.

At a recent camp-of-exercise a number of officers came to see this method of picketting, and found it hard to believe that the rope could be really firm. But after the lustiest of them had failed to move it when pulling along the ground as in Fig. B., they became convinced that it is "good business." If it is feared that the picketting rope may be spoiled by being buried, a loop of some cheap material may be carried for this purpose, and the picketting rope can be attached to the above-ground end of it.

Apart from its uses for the picketting of animals, the implement has many subsidiary uses in the hands of the native soldier; for under the name of "Gundála," "Mamootic," "Pharawa," etc., a little hoe of this kind is the national agricultural implement, and he consequently takes more kindly to the use of it and gets far more value from it in proportion to its weight than from our picks and shovels. When both kinds of implement are to hand, he will by preference use the "Gundála" for making cooking-places or latrines, cutting trenches round his tent when rain is threatening, clearing the camping ground of weeds, etc., as well as for splitting wood for burning.

Finally, as regards the making of rapid cover from fire. A very good rifle-pit for a man lying down can be made in about ten minutes by a native soldier in ordinary soil, and in less time in sandy soil; the rapidity and dexterity with which they use the tool, working up the loosened earth with their hands, is a revelation. Very hard soil is of course more difficult to tackle; but so it is with the pick and shovel, and the latter are not usually at hand when wanted in a hurry: even if at hand, their distribution loses valuable time, and they cannot be used by a man lying down, whereas the "Gundála" can be used in any position, except standing. We read of the Japanese soldiers digging themselves in with their bayonets, although their regulations provide an unusually ample amount of entrenching tools. The Russians also frequently had recourse to the same very unsuitable instrument, showing how essential it is that each man should have some entrenching tool when exposed to modern rifle fire. I am quite aware that entrenching is not so

vital for the cavalry as it is for the infantry soldier. But it must very often happen that the cavalry have to seize and hold on to a position until the arrival of the other arms. We had constantly to do this in mounted corps in South Africa. The man who is for the moment a rifleman is at a serious disadvantage if opposed, without means of constructing cover, to rifle fire. We give him a rifle and train him to the highest point in its use, but omit the corollary to the rifle; for an entrenching tool is the natural corollary to the rifle under many circumstances where a position has to be held for a considerable time.

The above instances do not exhaust the uses to which a "Gundála" may be put. Kipling makes his South African mounted infantryman say,

"The things I have used my bayonet for
Would make a tinker ill."

An implement, like the "Gundála," would prove every whit as generally useful as a bayonet.

The pattern recommended is shown at the beginning of this article, and should be carried with a little leather or khaki envelope over the blade.

REFLECTIONS ON THE TRAINING OF BRITISH AND INDIAN TROOPS.

A note on A. L. B's article on the above subject (vide January Journal, 1910).

By A. W.

A. L. B's "Reflections on the Training of British and Indian Troops" in the January number of the *Journal* give food for thought, but is he correct in suggesting that officers of the British service should pass a prescribed colloquial test in Urdu, the *lingua franca* of the country?

Urdu may still be the *lingua franca* of the country, but the question arises, is it still that of the army as it used to be? My experience is limited, but I am inclined to think that, with the introduction of the obligatory language test, Urdu ceased to be the *lingua franca* of the army. The reason being that when the men discovered that it was compulsory for the officer to speak their language and make himself intelligible in it to them, they never bothered to try and understand what he said, unless he spoke the language very well; in fact, with some transfrontier men, they made up their minds beforehand, that they never could understand what a sahib said, so didn't try to.

I am quite sure that if an officer, who had passed the Higher Standard Urdu, and served many years in this country, were to address a lot of men of my regiment in that language, not one in twenty of the men in the ranks would understand a word he said. I quote an example to show how little some men know of Urdu. One day, I was watching a squad of our men going through gymnastics, and the instructor was giving that somewhat verbose caution, "On the forepart of the feet—Down!" He was a fairly intelligent sepoy, of about four years' service, so I asked him the meaning of that particular caution, and he replied, "Who knows? I can't understand the Hindustani-bāt." I myself can speak several languages fairly well. I can read and write our obligatory language easily, which is more than most officers can do, and I used to think I could speak it well; but many times in recent years I have made a most simple remark in his own language to a young sepoy, and seen him look hopelessly at a native officer or non-commissioned officer, who would repeat it, using exactly the same words I did, and he would understand at once. I may be unfortunate, but the fact remains, and I know many officers who hold the same opinion I do, which, put concisely, resolves itself into this:—Without a common language one cannot have a homogeneous army. Twenty years ago, the drill-books were all printed in Urdu, with either the Persian or Nagri character,

and all the cautions and explanations were taught in Urdu throughout the army; consequently all had to learn it a little. Now-a-days, they are printed in Gurmukhi, Pushtu, Gurkhali, etc., so the men in some regiments never hear Urdu spoken unless they go to the bazar, and in some parts of India not even then, so how would all officers learning a little Urdu help them to make themselves intelligible to men who never hear it spoken in the course of their duty?

Years ago, we had a Commanding Officer, who had done a lot of staff service, and he, because he found it difficult to understand our men's language, used to say that all sepoy, especially those who hoped for promotion, should be made to learn English throughout the army, as Polish and Alsatian recruits have to learn German. At the time, (it was before the compulsory examination was introduced), I used to think this idea of his rather absurd. Now, I agree with the principle of what he said, insomuch that I think all officers of the Indian army should be able to make themselves intelligible to the men of any unit in the service, and also to understand what they say, but this can only be when Urdu is once more, as it used to be, "the language of the camp."

It would be sufficient if the obligatory test were accessory to Urdu, instead of superseding it entirely as it does in some regiments now-a-days.

A universal language would do a great deal towards making the army in India homogeneous.

NOTES ON BRITISH WAR MEDALS.

The following notes on Major MacMunn's article published in the U. S. I. Journal of October 1909, have been furnished by "Collector" and by Major J. A. Wilson, 8th Gurkha Rifles.

NOTES BY COLLECTOR.

A few corrections and additions appear necessary to the comprehensive and interesting article on British War Medals which appeared in the October issue :—

1. All old medals are not *indented* with the recipient's name; many of them were engraved, and some in running hand. Among others one may specify the medals issued to the 40th Foot for Candahar, Ghuznee, and Cabul in 1842, and many of the Kelat-i-Ghilzie medals.

2. The first medal issued by the H. E. I. Co. to native ranks generally seems to have been for services between 1778-84, and not 1786-89. Some uncertainty indeed exists on this point, but the Persian inscription on the reverse reads "Presented by the Calcutta Government in memory of good service and intrepid valour. A.D. 1784, A. H. 1199.

3. The Mysore medal 1791-1792 was struck in two sizes.

4. The first service entitling the recipient to the medal to the army of India was the storm of Allighur, 1803. The date on the reverse of the medal is 1799-1826. The reason of this discrepancy appears to be that it was intended at first to include the Mysore war and capture of Seringapatam, 1799, in the list of services for which this medal was to be granted. The medal was designed and approved, but on account of a special Seringapatam medal having been granted to all ranks, both British and Indian, in 1799, this service was struck out; but the date on the medal appears to have escaped notice. The medal and clasps for Nepal and Ava were not issued to those native ranks who had previously received the special native medal issued for these wars.

5. Kelat-i-Ghilzie 1842.—The garrison included also three companies of the 43rd B. N. I. and 60 Sappers and Miners.

6. Cabul 1842.—The 44th Foot did not perish to a man literally. Vincent Eyre, himself one of the captives, gives in his "Narrative" a list of all the European prisoners recovered by Pollock. The names include those of 3 officers and 38 other ranks of the 44th. Pollock rescued many hundreds of natives as well.

7. Gwalior 1843.—The stars given by Lord Ellenborough to the four ladies in question differed considerably from those issued to the troops. The former bore on the obverse the Queen's head, and were suspended from gold and enamel ribbons and buckles. The star

issued to Lord Gough had in the centre a silver elephant, instead of a smaller silver star; this latter design was an alternative one, adopted on account of the expense of the first design.

8. India medal 1854.—The clasp "North-West Frontier" was first authorised in 1869, and it was given later for the Mohmand expedition of 1864 and the Hazara (Black Mountain) expedition of 1868. This clasp did duty for 18 expeditions from 1849 to 1868 inclusive.

9. China 1842.—Though no clasp was issued with this medal, yet the recipients who served in the 2nd China War, 1857-60, as well, received the clasps issued for that war, to which they were entitled, to wear with the 1842 medal, and *also* a special clasp "China 1842", that they might "not lose the reward and record of their former services." Sir Hope Grant who commanded in China in 1860 had previously served in the first Chinese war as Brigade-Major to Lord Saltoun, and there were many others who served in both wars.

10. Collectors generally would agree with the contention that the Government should destroy the old dies, but there is this practical difficulty that medals and clasps have to be issued by authority, many years after the original date of issue, to replace those lost or destroyed through no fault of the recipients, or on account of the claim not having been submitted previously. For instance it is stated that Lord Wolseley lost all his original medals in the fire at the Pantechnicon, London, where they were stored during his absence on the Gold Coast in 1873-4; and Carter records that a Peninsula medal with the clasp "Nive" was issued in *March 1889* to Captain Gamwell, who left the service soon after the war was over, and neglected to put in his claim in 1847. These considerations would seem to make the destruction of a die practically impossible until a period of 50 or 60 years has elapsed.

NOTES BY MAJOR J. A. WILSON, 8TH GURKHA RIFLES.

Major MacMunn, in his article on War Medals and Decorations in the October number, classes the so-called Monghyr medal amongst the war medals issued by the Honourable East India Company.

Although some collectors term this the "Monghyr medal," there is absolutely no evidence to show why it was struck, or that it was ever intended as a military reward.

It bears the date 1766, which is that of the Monghyr Mutiny, but as this affair was not an armed mutiny, but merely an insubordinate combination of the officers of the Brigade stationed at Monghyr to protest against the new batta rules, and as no armed resistance was offered to the two native battalions Clive brought down as his escort, it is scarcely likely that the rewards he promised those two battalions, for a not very arduous journey, would take the form of war medals, when none had been given for Buxar or Plassey. The date therefore may be only a coincidence.

I am aware that in Tancred's book on medals, he describes the figure on the obverse as that of Britannia, but the most casual inspection of the medal, or a picture of it, will show his mistake.

The female figure, wearing a helmet, holds a spear in her right hand instead of a trident; her shield bears the head of Medusa instead of the Union cross, and beside the shield is seated an owl, so what can the figure represent but Minerva, the goddess of wisdom?

Minerva, coupled with the motto on the reverse "NON NISI DIGNO," would be an appropriate design for a reward for learning, more so than for war service; for though Minerva was supposed to guide the brains of heroes in battle, she was still more the inspirer of the arts of peace. It would be interesting, therefore, to know if any college or scholarship were founded in India in 1766.

A medal was sanctioned for the Mutiny at Vellore in 1806; in gold for commissioned officers, and in silver for non-commissioned officers and men, bearing the Persian inscription "Distinguished by courage and fidelity, A. B. has received this mark of honour in consequence of his devotion to the Government of the English Company, Bahadur." Strange to say, after the medal being approved, it was never issued.

Major MacMunn states that the form of the badge for Amboyna is not known. There are at least two of these badges in existence. The shape is a semi-oval, something like the cap-plate of a grenadier of the Georgian era.

The badge, which was in silver for officers, and brass for men, was worn on the arm with the curved side uppermost.

Similar badges were given for expeditions to Banda and Manila between 1795 and 1801.

The design of the Amboyna badge is as follows:—

Above all, two roughly-engraved sprigs of laurel, below them the words "Volunteer Battalion," under this, "Amboyna, 1796," below the date, **فوج داغستان**, and at the bottom of all two sprigs of laurel crossed and tied with a bow.

Two holes are bored on either side for sewing the badge on to the left sleeve.

Another very interesting badge, of which no mention is made, is that given to native troops for the battle of Assaye. It was sanctioned in 1811, and issued in 1813, in silver to commissioned officers, and copper to the rank and file. It is in the form of an elephant, very similar to that worn on the collar, now-a-days, by the Seaforth Highlanders.

The 8th Madras Infantry, who were broken up a few years ago, had a bit of regimental plate made of a small silver elephant, said to have been looted at Assaye.

On the howdah, which formed a snuff-box, were engraved the names of every officer of the Regiment who was present at the battle. I wonder what has become of this relic.

The Company's medal for Nepal was not a universal issue. It was given only to native officers, and those non-commissioned officers

and men who had specially distinguished themselves; consequently, when the Army of India medal was issued, the surviving sepoy, who had served against the Gurkhas but had not received the former medal, claimed and received this one.

An interesting point to observe with regard to the Medal for Burma, 1824-26, is that on the reverse is depicted a steamboat shelling the big Pagoda. This must have been the first steamer in India.

Major MacMunn's amusing story about the Queen's remark on the design of the Chitral medal, as first submitted, applies quite as fitly to those of the Seringapatam and Java medals, for in both of these will be seen flags flying in opposite directions. Again, in the Nepaul medal it will be noticed that the flag is floating one way, and the smoke from the gun blowing the other. The designer of this last medal evidently could not draw a man.

With regard to the African medals in group IX, it is a curious fact that these afford an instance of one medal being issued to British troops, and another to Indian, for the same expedition.

The native contingent who served at Liwondi, and on Lake Nyassa in 1893, received the Central African medal with ring, and black, white, and tan ribbon, while the sailors who accompanied them received the same medal with black and yellow ribbon, and clasps for "Liwondi" and "Lake Nyassa," so the native soldier with his British officer received a "bare-faced" medal, while their naval comrades got a medal and two clasps for the same service.

The only clasp worn with the black, white, and tan ribbon, as far as I know, is that for "Central Africa, 1894-98."

The first clasp issued to the second African general service medal was "Uganda, 1900"; this was, therefore, at the first a retrospective medal, as its obverse bears the King's head.*

The reverse of this and the first Uganda medal are somewhat similar in design to that for the mutiny, except that, as a native officer once put it to me, "the man is riding the lion back again."

From group XI the "conspicuous gallantry" medal has been omitted. This is a very rare medal and was given only to the Navy. For the first issue, after the Crimean War, the die for the "meritorious service" medal was used, the words "for meritorious service" being scraped off the reverse of the impression, and "For conspicuous gallantry" *engraved* in their stead. This medal was revived, with a properly-struck die, after the Ashantee War of 1873-74, and it was last issued in 1884. It was never given to officers, nor was the medal for "Distinguished conduct in the field." Major A. Caulfield, formerly of the Border Regiment, however received this latter medal when serving in the ranks at the battle of Maiwand, and he subsequently won the D.S.O. in Burma as an officer.

* The "Ashanti, 1900" medal also bears the King's head.

PRECIS OF FOREIGN MILITARY PAPERS.

RUSSIAN PAPER.

MACHINE GUN QUESTIONS.

[*Voenne Sbornik*, August 1909.—Author FEDOROFF.]

The author discusses the questions under the present short service system of keeping machine gun detachments together with their establishments of under-officers up to strength. He comes to the conclusion, that the best method of doing so is by appointing to them young soldiers direct on joining. In this way they immediately come under the hand of their actual leader.

The different types of machine guns are gone into.

The Russian Army is now armed with the Maxim machine gun, the right of manufacturing which they have obtained, and aver that they are second to none, and that the barrels are incomparably better than those of German and English make. The majority of Governments have adopted the Maxim machine gun; Germany, Roumania, Turkey, and China have the Maxim; Austria the Shvartzloze, and Japan the Hochkiss, also the Maxim; France has the Hochkiss in the infantry, the Pioteaud in the cavalry and the Maxim in the navy; England the Maxim. Generally speaking, the existing machine guns and quick-firers may be divided into three types:—

(1) With the barrel coming into action from the recoil (Maxim, Bergman, Nordenfeldt, and the Madsen quick-firing gun).

In these types the bolt is so closely pressed to the barrel, that, after firing, the bolt and barrel recede, not separating from one another, but doing so immediately afterwards. Thus the possibility is removed of the disruption of gases when firing.

(2) Those with non-receding barrels from the recoil (Shkod and Shvartzloze). In these types the bolt flies back with the force of the pressure on it of the base of the cartridge, during which the cartridge itself is shifted somewhat from its place in the belt, and in the event of the cartridge being damaged, there may be a violent disruption of gases.

(3) Those with barrels having an aperture, through which a portion of the gases passes into a cylinder for the purpose, with a piston, setting in action the closed mechanism.—(Hochkiss, Colt, and the Odkolek quick-firer.)

The author says that with the exception of the Shvartzloze not one of these guns can be compared to the Maxim.

(a) The Nordenfeldt machine gun only exists in plan; since the Maxim and Nordenfeldt firms became one this gun has not been touched.

- (b) The Perineaud machine gun is only being experimented with in Italy, concurrently with the Maxim machine gun, and the Press gives varied accounts of it, sometimes that it is satisfactory, at other times the reverse.
- (c) The Hochkiss machine gun does not possess a cooling apparatus, so the barrel is made thicker and has several thick raised bands for increasing the emission of heat through the surface. Notwithstanding this it gets so red hot that after 1,000 shots of continuous firing, one can light a cigarette on the barrel. The cartridges are placed in metal partitions in sets of 24. It is imperative that all the hooks keeping the cartridges in their partitions are adjusted properly, as the slightest jar may cause checks in the feeding of the cartridges. A special man is necessary for placing these partitions in position. The leading off of the gases, for bringing the piston into action is in itself a great disadvantage of the system. The pipe of the piston quickly gets fouled, and delays occur. In the vent for the escape of gases red hot fumes are generated. Besides this it is difficult to change the scalding barrel, and it is difficult to grasp at once the cause of delays. The barrels are very costly.
- (d) The Pioteaud machine gun is a similar one to the Hochkiss, but somewhat improved; it possesses a method for the quick change of a heated barrel, and has a cartridge belt in lieu of metal partitions. The French use the Hochkiss and Pioteaud guns, and manufacture them in their own factories. They pan out cheaper. The Press criticisms on the Pioteaud gun are very various, both in praise of it and otherwise.
- (e) The Colt machine gun is similar to the Hochkiss. The gases escaping through the aperture in the barrel do not press on the piston but on the valve, which is placed in conjunction with a special screw valve lever, acting on the closed mechanism. This proves to be worse than the Hochkiss, because if in the aperture red hot fumes are set up, the safety valve stopper too easily comes out, with the inevitable disruption of gases. When changing the barrel the stopper may not fit compactly. Besides this the bolt is adjusted in an oblique direction which is not so suitable for the requisite setting up of the force of recoil.
- (f) The Bergman machine gun has a jacket casing with water, a moving barrel, and cartridges in long metallic belts. This machine gun is not yet completed, it has been nowhere thoroughly tested and they are still working at it. A firm is exploiting it, engaged in altogether different manufactures and having little interest in the gun. A linen cartridge feeder is now being adapted to it.

- (g) The Shkod machine gun has a sliding adjustment like a balance, with the rise of the weight of which one can regulate the rapidity of fire. The pendulum is seen projecting under the gun portion; when packing up it may get broken and then the gun is unserviceable. The cartridges in iron bands are placed under the gun. The feeding of cartridges may be irregular, from which a check may arise. The iron bands require a special man, whom it is impossible to conceal, as he must press with his hand on the cartridges from above, so that they come regularly from the iron bands into the interior mechanism. They manufacture the gun in Shkod's factory in Pilsen. It has been experimented with a good deal in Austria, and there they have abandoned it to fortresses and for such occasions where it can be arranged with a shield.

Now to compare the Maxim and Shvartzloze machine guns : we notice that in the method of cooling (a jacket casing with water), the method of feeding with cartridges (cloth feeders), and the rapidity of fire, they are equal ; but in their mechanism is a radical difference. The Maxim machine gun is more complicated, has more springs, is heavier and dearer. In the Maxim the barrel is moveable, in the Shvartzloze immoveable. For this reason in the former the occurrence of a disruption of gases is very rare and then only in a very insignificant degree. This could only occur on the cutting through of the cap, which only happens with an irregularly placed one. In the Shvartzloze a disruption of gases may occur if the cartridge fits loosely in the belt, and projecting a little from it on recoil may cause the fired case to break, so that while the bullet is still in the barrel, the pressure of the gases on it is weakened and the flight of the bullet is retarded. With the frequent disruption of gases the cartridge belt gets so fouled that the bullet does not thoroughly take the grooves ; a jam occurs and the gun ceases to fire. For the removal of such a serious flaw there is fixed in the gun an automatic greasing arrangement, so that every cartridge is greased before it enters the barrel. From our experience with the gun as soon as the greasing ceases the gun stops firing. The conclusion arrived at is that the Maxim still holds first place among the different types of machine guns.

REVIEWS.

"The Rifle in War."—By HENRY E. EAMES, CAPTAIN, 10TH UNITED STATES INFANTRY.

On taking up a work of this kind one's first inclination is to see whether its author, himself in all probability a musketry expert, has been led into plunging too deeply into theory and the, to him, interesting subject of computations and probabilities, while neglecting, or devoting but little attention to, the practical side of musketry. It may at once be said that the author of the "*Rifle in War*" has successfully avoided falling into any such error, and, while a portion of the book is devoted to theory and a statement of the mathematical calculations on which deductions are based, such portion is embodied in a distinct chapter, and, as the author himself says, the remaining chapters "are thus freed from computations to such an extent that the student can concentrate his attention solely on the fire lesson, accepting as true the general statement of the mathematical results, or, accepting them for the moment, he may later return to this chapter (Computations) and prove their accuracy to his own satisfaction."

It is evident that Captain Eames has made a very complete study of the works of all the best modern authorities on musketry and infantry fire tactics, and he has given us the results in a very readable and practical form.

The first chapter on elementary principles does not call for particular remark; the descriptive terms used vary to a certain extent from those with which we are familiar, but can easily be identified. We may, however, take this opportunity of noting the author's discussion in this and the following chapters of the apparently anomalous saying—"the better you shoot the less you hit," a theory which has led some people into the fallacy of arguing that instruction in accurate firing is a waste of time. Captain Eames, in the first place, very clearly explains (page 39) what this expression means, *viz.*, that the more highly trained the marksman the smaller will be the cone of fire, and that, if the centre of impact is not properly placed (*i.e.*, if the elevation is not correct), a close shooting squad may miss the target with every bullet, while a poorer shooting squad with a much larger, *i.e.*, more dispersed, cone of fire may still get hits upon it. The deduction he draws from this indisputable fact is, not that training in good shooting is useless, but that the person directing the fire must be highly trained in estimating distance, so that the centre of impact may be properly placed, and a high percentage of hits thus obtained. He also points out (page 141) that, strictly speaking, the truth of the foregoing proposition applies only to the longer ranges, and that at ranges less than 500 yards the effect of fire depends largely, if not entirely, upon its accuracy.

We cannot do better than quote the writer's own words in support of the necessity of instruction in firing for the men and in the correct estimation of distances for their leaders:—"It is here, at the decisive ranges, that skill in shooting will pay for the time and labour of training. A less careful training in marksmanship would deprive the soldier of confidence in his ability to hit the object at which he is firing. On the range he learns not only the elements of aiming, holding, and firing, but also it is impressed upon him that he can only hope to make a hit by careful aiming, and the benefit of this is that in battle he will take pains to aim and fire correctly. If, on the other hand, he regards any hit at all as a result of chance, rather than as a result of his skill, he will scarcely raise the rifle to his shoulder, much less will he make any attempt to aim. At the longer ranges the officer must understand that effective fire depends almost wholly upon him, for his estimate of the elevation is more important than the skill in marksmanship of the firers. The rule should be to train men to small dispersions, and officers and non-commissioned officers to small errors in estimating the distance."

Chapter II is, as we have said, devoted to mathematical principles, which the reader, if so minded, may omit without detriment to his understanding of the lessons conveyed in the rest of the book; but the subject-matter of this chapter is by no means abstruse, and will well repay perusal. The importance of the distribution of fire is here exemplified, as well as the fact that "it is not the percentage of hits, but the number of men disabled that measures results in war."

We have not space to refer fully to the subjects included in Chapter III; they are all of importance and are clearly explained and discussed. But the author's remarks on the subject of the limitation of individual instruction to ranges of about 500 yards must be noted; this is a principle now adopted in our own service and embodied in the new Musketry Regulations. He says:—"At a range of (? over) 500 yards a miss made by the soldier is as likely to have been the result of meteorological conditions as to have been due to faulty aiming. Below this range, in an increasing measure, the soldier's errors in aiming can be pointed out to him and corrected"; and again, "since individual soldiers will not (except in abnormal situations) ever fire at the longer ranges, and so will never have an opportunity to exercise judgment in the matter of the allowances to be made for atmospheric conditions, it follows that the mechanical part of the shooting instruction is all that it is necessary for the soldier to master, and it is for this reason that individual instruction should not be given at ranges greater than 500 yards."

As a corollary to this, the importance of fire discipline and of the training of leaders in the control and direction of fire naturally follows.

The two following chapters are decidedly the most interesting in the book, for they treat of the practical application of the principles and theories previously discussed. None of the subjects in Chapter IV are other than of great interest and importance, but we

would especially draw attention to the author's insistence on the necessity of equal training in fire tactics and manoeuvre tactics, his clear distinction between direction control and execution of fire, and the discussion on the questions of the "distribution of fire" and the "time of opening fire." In connection with the latter, the writer strongly discountenances long and medium range fire in the attack. "Long and medium range fire by the attacker must always be regarded as only a means to an end, to be avoided as long as possible, a temporary makeshift to enable him to reach decisive ranges and to cover the advance of formed bodies behind the firing line. Experience has shown that an attacker who opens fire at long ranges seldom gets as far as the short ranges, and it is not until the short ranges (say, 800 yards and under) are reached that the infantry fire action proper commences." On the other hand, he says we must have regard to the principle that we should fire whenever the effect produced, or to be produced, whether it be physical or moral, is in proportion to the consumption of ammunition, and that consequently we must be prepared to use long-range fire when the mistakes of the enemy lead him to present a favourable target. "The great range possible to the modern rifle will make these chance targets much more frequent than at first sight might be supposed."

In Chapter V we have given us an example of what the author terms the "applicatory system of instruction" in fire tactics, a system as applied to manoeuvre tactics with which students of Griepenkerl will be familiar. It contains a series of problems with solutions which the author, while not claiming them to be the only correct ones, maintains are reasonable and not incorrect. The problems are all thoroughly practical, and, though the absence of the map to which they refer detracts somewhat from their interest, they furnish excellent examples and suggestions on which to base similar problems either with maps or on ground which may be available to the student or instructor. The author points out that the solution of a fire tactical problem must rest upon an appreciation of the situation just as in an ordinary tactical problem.

The remarks on page 268 as to the importance under certain circumstances of firing commencing simultaneously throughout the company, or other complete unit opening fire, and the means of ensuring this, are worth noting.

Experiments have recently been made in the U. S. Army with telescopic sights issued to expert riflemen. Instances where these might be usefully employed are given on pages 286 and 289.

Chapter VI is devoted to giving the author's ideas on methods of instruction. We have nothing to criticise in these; they are practical and sound, and in fact are practically the same as those prescribed in our own training manuals. The "Trajectory Apparatus," described in this chapter, at first sight seems a somewhat complicated device, but its utility in practically demonstrating to the troops the cone of fire and the influence of incorrect elevation on the placing of the shot group is undoubted.

Emphasis is laid on the necessity of practice in picking out and designating targets, which the author describes as a "neglected rt." It is certainly one which has until recently received indifferent attention in our own army, but the clear instructions on the subject in the new Musketry Regulations should remedy this in future.

In conclusion, we believe that the tendency of this book is to remove the erroneous belief that musketry is an abstruse subject apart from general military training, and that it will well repay a close perusal by all officers.

Official History of the Russo-Japanese War.

The Historical Section of the Committee of Imperial Defence have issued a second edition * of Part I of the Official History of the Russo-Japanese War. It will be remembered that the first edition was published over the name of the General Staff. The alterations in the second edition are chiefly in arrangement. Some fuller details of the battle of the Yalu are included, but in essentials the first edition remains unaltered.

Among the alterations we notice :—

- (1) The disposition of the Russian field troops at the beginning of the war is amended and now conforms with that given in foreign official accounts.
- (2) A useful note giving the composition of the Japanese brigades and divisions is now included.
- (3) The dramatic little story of the consternation produced in Japan by the news of the Russian fleet having left Port Arthur during the period of preparation, is now omitted.
- (4) An interesting sketch plan to illustrate the advance of the First Japanese Army to the Yalu is now inserted, and the movements of the army are described in considerably more detail.
- (5) The reproduction of the Japanese sketch map of the action near Ha-Ma-Tang is now omitted.

As in all the official accounts so far produced by the Committee of Imperial Defence, all criticism is withheld until the completion of the combined Naval and Military History. But the account of the operations is so clear and connected that the reader has little difficulty in forming his own judgment.

The book compares favourably as regards arrangement and matter with the official accounts of other nations.

* Harrison and Sons. Price, 1s. 6d.

ACKNOWLEDGMENTS.

We have to acknowledge, with thanks, the receipt of the following new books:—

Story of the Campaign in Eastern Virginia (from April 1861 to May 1863, with Whitehall Series of Military Map), by Lt.-Col. H. M. E. Brunker. Price, 5s. net. (Presented) Forster, Groom & Co., London, 1910.

Regimental Records of the 1st Royal Dublin Fusiliers, 1862—1842. (Presented) Hugh Rees, Ltd., London, 1910.

Historical Records, 76th Hindustan Regiment, by Lt.-Col. F. A. Hayden, D.S.O. (Presented by Author.)

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SECRETARY'S NOTES.

I. NEW MEMBERS.

The following Members have joined the Institution during the months of March, April, and May 1910 :—

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| 32 Capt. S. St. M. G. McRae. | 55 Lieut. A. N. Rolfe. |
| 33 Capt. W. G. A. Brett (Life.) | 56 Lieut. E. G. Strover. |
| 34 Lieut. J. C. H. Holliday. | 57 Capt. C. Nelson. |
| 35 Major J. H. Lloyd. | 58 Major E. H. Boome. |
| 36 Capt. H. D. Shaw. (Life.) | 59 Major L. A. Smith. |
| 37 Col. C. H. P. Carter, C.M.G. | 60 Major E. B. Steel. |
| 38 Major A. McCormick. | 61 Major A. M. Bent. |
| 39 Major R. P. Stares. | 62 Capt. C. M. G. Withers. |
| 40 The Secretary, 14th Lancers Livery. | 63 Major B. G. Sanford. |
| 41 Capt. E. Talbot. | 64 Lieut. Malik Mumtaz Mohamed Khan.
(Life.) |
| 42 Capt. D. B. Edwards. | 65 Lieut. E. S. Woodward. |
| 43 Lt.-Col. S. F. Crocker. | 66 Capt. M. A. Girdlestone |
| 44 The Mess Secretary, 33rd Punjabis. | 67 The Hon'ble Surgeon-General C. P.
Lukis, M.D., I.M.S., V.H.S. |
| 45 Lieut. H. G. Chippindall. | 68 Capt. W. Lumsden, R.N., A.-D.-C. |
| 46 Capt. C. F. W. Hughes. (Life.) | 69 The Hon'ble Mr. S. H. Butler, C.S.,
C.I.E., I.C.S. |
| 47 The Mess Secretary, West Yorkshire
Regiment. | 70 Surgeon-General F. W. Trever, C.B.
M.B., V.H.S. |
| 48 Lieut. R. E. Harenc. | 71 The Hon'ble Mr. A. Earle, C.I.E.,
I.C.S. |
| 49 Major S. D'A. Crookshank. | 72 Capt. W. G. K. Gough. |
| 50 Br.-Genl. A. Hamilton Gordon, C.B. | 73 Lieut. H. L. Scott. |
| 51 Capt. A. R. B. Shuttleworth. | 74 Major G. Bailey. |
| 52 Major H. A. Cameron. | 75 Major P. G. Twining. |
| 53 Capt. E. M. Taylor. | |
| 54 Capt. F. H. Sykes. | |

II. GOLD MEDAL ESSAY COMPETITION.

1. Acting on the advice of the adjudicating officers, the Council of the Institution have decided to award no gold medal this year for the essays sent in on 1st March last, none of which were considered to have reached the standard of excellence requisite for this honour. The Council, however, awarded a special honorarium of Rs. 100 to Major A. L. Tarver, 12th Baluchistan Infantry, the writer of the essay adjudged first in order of merit of those sent in.

2. The Council have selected as the subject for the Gold Medal Essay Competition for 1910-11, the following:—

'The maintenance of law and order in India, considered in relation to the mutual co-operation of the Civil and Military powers in the country.'

In order to give officers time to complete their essays after the drill season is over, the Council have extended the date for submission to 30th June, 1911, and, owing to the importance of the subject on this occasion, it has been decided, as a special case, that the competition shall be open to all Gazetted officers of the army, navy, and civil administrations. Regulations for the competition will be found on a leaflet issued with this Journal, and any further information required can be obtained from the Secretary.

III. MACGREGOR MEMORIAL MEDALS.

3. The Council of the United Service Institution, on the recommendation of His Excellency the Commander-in Chief in India, have awarded the following Macgregor Memorial Medals for valuable reconnaissance work:—

To Major P. M. Sykes, C.M.G., Consul-General, Meshed, a special gold medal.

To Captain F. G. Turner, R.E., a silver medal.

To Khan Bahadur Sher Jung, Survey of India, a silver medal and an honorarium of Rs. 100.

IV. CHANGES IN THE REGULATIONS.

4. At the first annual meeting of the Council of the Institution held on 13th May, 1910, it was decided that, with a view to increasing the interest taken in the Institution by the Civil Service, the Royal Navy, the Royal Indian Marine, and the two Medical Services, representatives of each of these services should be asked to join the Council as *ex-officio* members. It was further decided that certain officers of the army be asked to be *ex-officio* members of the Council, and that, to make this possible the numbers of the Council should be increased from 15 to 20. Section V of the Regulations was accordingly altered as follows:—

V.—GOVERNMENT.

1. COUNCIL.

i. The Council shall be composed of twenty members, of whom the following ten shall be asked to become members *ex-officio*:—

The Secretary of the Army Department.

The Chief of the General Staff, India.

The Adjutant General in India.

The Quartermaster General in India.

The Director of Military Operations, India.

Two representatives of the Indian Civil Service, of whom one shall be from the Foreign Department, and one from another Department of the Government of India.

One representative of the Navy or R.I.M.

The Principal Medical Officer, India.

The Director General of the I.M.S.

The remaining officers, to make up a total of twenty, shall be elected annually on 1st May, or as soon after as possible, from amongst members of the Institution resident in Simla, not necessarily chosen on account of their official position. Officers invited to become *ex-officio* members of Council, and who are not already members of the Institution, shall be asked to join.

V. TACTICAL SCHEMES (Q. I. Series).

10 To assist officers studying for Q. examinations, tactical schemes are issued by the Council of the Institution, to members only, on the following terms : —

Rupees 5 per scheme, or Rs. 50 for a complete series of ten schemes, these charges including criticisms and solutions by a fully qualified officer selected by the Council.

Two revised sets of schemes (Series IV and V., 10 schemes in each series) are now available.

A number will be allotted to each member applying for papers, and solutions must be sent under these numbers to the Secretary, United Service Institution of India, who will forward them to the appointed officer.

VI. MILITARY HISTORY PAPERS.

11. In order to assist candidates for the Staff Colleges and other officers in the study of military history, the Council of the Institution have decided, as a tentative measure, to issue, to members only, sets of questions on selected campaigns. The following papers are now available :—

(a) Two sets of six questions each on the Indian Mutiny.

(b) Two sets of six questions each on Callwell's Small Wars.

(c) Two sets of six questions each on the strategy of the Russo-Japanese War.

(d) Three sets of six questions each on the Battles of the Russo-Japanese War.

The charge for these papers is Rs. 5 each, or Rs. 45 for the set of nine, including criticisms by fully qualified officers selected by the Council.

A number will be allotted to each member applying for papers, and solutions must be sent under these numbers to the Secretary, United Service Institution of India, who will forward them to the appointed officer.

VII. CHANGES OF ADDRESS.

Members are requested to keep the Secretary informed of all changes of rank, title, or address.

VIII. ANNUAL SUBSCRIPTION.

As a result of the replies received from members to the circular letter of 19th November, 1909, the Council have decided not to raise the subscription from Rs. 5 to Rs. 10, and not to increase the number of Journals from four to six per annum.

IX. OLD ARMY LISTS.

The Council of the Institution having a number of old and rare army lists for disposal, have decided to present them to such divisional and brigade libraries, regimental messes, and individual members as may care to apply for them. Particulars of editions available will be found on an advertisement page. Applications will be dealt with in the order in which they are received by the Secretary, priority of claim being given to libraries and messes which subscribe to the Journal.

THE GENERAL STAFF.

A lecture delivered to the Staff College, Quetta, on 1st April 1910.

BY COLONEL J. HEADLAM, D.S.O.,

Director of Staff Duties and Military Training.

GENERAL CAPPER AND GENTLEMEN,—

I must in the first place express the regret of Sir Douglas Haig at not being able to be present here himself. But you will understand how much occupied the Chief of the General Staff must have been in connection with the formation of the General Staff which has just become a *fait accompli*. His time for touring has in consequence been much curtailed, and the arrival in India by the last mail of the new Director of Military Operations has necessitated his returning to Simla earlier than usual.

In the presence of General Capper and of the professor of Staff Duties here, it would be presumptuous for me to address you on the *general principles* of the organization and working of a general staff. But, while you in the serene air of Quetta can imbibe from them the pure gospel, we in Calcutta are brought face to face with the hard logic of facts; and the practical application of these principles to the actual conditions of the staff in India has presented a problem of some complexity. It is on this aspect of the case that Sir Douglas Haig wished me to speak to you to-day, so that you might understand something of the difficulties of the task, and might appreciate the reasons for the actual decisions arrived at as expressed in last week's Army Orders.

But perhaps you will allow me first, for the benefit of the junior division at any rate, to remind you of the principal stages in the evolution of the General Staff idea in the British Empire.

The effect of the South African War was to bring home to the Government that we had gone into that war without adequate preparation on a great scale, and that we had never fully apprehended the importance of the maxim that all preparation in time of peace must be preparation for war. In consequence, when the war was over, the Home Government set to work to put the military organization into shape, and in 1904 adopted the complete scheme for the reorganization of the War Office and of the Army submitted by the Esher Committee. As explained by Mr. Haldane, the broad feature which emerged with regard to military preparation was this: von Moltke was able to organize victory for the Prussian and German armies in 1866 and again in 1870, because he, and the General Staff working under him, were able to apply their minds wholly to war preparation. That he was able to do this was due to

the fact that the organization and business administration of the army in peace were kept entirely distinct from the service which consisted in the study of war problems, and in the higher training of the staff, and of the troops.

The formation of the General Staff at home was the first result, the next was the meeting of the Imperial Defence Conference of 1907. This conference ratified certain general principles for the military defence of the Empire, but these I shall pass by. The Conference, however, did more than this—they recognised and affirmed the need of—

“developing for the service of the Empire a General Staff, selected from the forces of the Empire as a whole, which shall study military science in all its branches, shall collect and disseminate to the various governments military information and intelligence, shall undertake the preparation of schemes of defence on a common principle, and (without in the least interfering in questions connected with command and administration) shall, at the request of the respective governments, advise as to the training, education, and war organization of the military forces of the Crown in every part of the Empire.”

That definition is the foundation on which all further action connected with the General Staff rests.

It then became the duty of the General Staff at the War Office :—

First, in its capacity as the local section of the Imperial General Staff in England, to organize the forces there in accordance with the principles approved by the Imperial Defence Conference.

Secondly, in its capacity as the Imperial General Staff in embryo, to put forward definite proposals to give effect to the resolution of the conference as to the development of an Imperial General Staff which I have just quoted.

The former is rather beyond the scope of our discussion to-day, but there is one aspect of the work of reorganization at home to which I should like to draw your attention, because it touches us somewhat closely in India. It is a cardinal military maxim that no organization for defence can be regarded as adequate or complete which does not contemplate offensive action. The General Staff at home, therefore, set itself to determine what striking force it was within the power of Great Britain to place in the field at the outset of a great war, and then devoted all its energies to ensuring that that force should be really ready and complete in the due proportion of the respective arms, and in all the services that are essential for the maintenance of such an army in the field. Last year it was estimated that within the period laid down we could mobilize and place in the field a striking force consisting of :—

1 cavalry division,
4 divisions,

Army troops, including 2 mounted brigades, and the necessary line of communication troops, while two more regular divisions remained to be completed in certain details. Those of you who have studied Mr. Haldane's recent memorandum on the Army Estimates will have seen that steady progress has been made, and that we are now within a measurable distance of being able to add these two divisions to the Striking Force—a force which though perhaps not a large one as armies go on the continent, would certainly not be a negligible one even there.

But such a result could only be achieved by concentrating all efforts on the completion of the force which *could* be provided, even if this involved the sacrifice of units which were superfluous to it.

I have made this digression because the time has come when such a stock-taking must be made of our forces in India. This will be the first work of the Director of Military Operations, and I know that the Chief of the General Staff contemplates associating you at the Staff College with him in this enquiry.

To return to the subject which more nearly concerns us this morning—the formation of an Imperial General Staff. The action taken by the General Staff at the War Office was to draw up a paper on the subject, which was circulated last year to the various Governments. In this paper the general principles affecting national defence are further considered as they apply to the British Empire, and it is deduced from these how essential it is that all the forces of the Empire should be capable of acting in war as parts of a whole, an ideal which can only be fully realised when all the parts are organized and trained by one brain. But in a modern army that brain is the General Staff, and the General Staff must therefore be an entity throughout the Empire. It is in accordance with this principle that the Secretary of State, in authorising the formation of a General Staff in India, laid it down that it should be formed “on the lines laid down for the Imperial General Staff.”

What are those lines? They are contained in the paper prepared by the General Staff, and circulated as I have said, to the Dominions. This paper had just been received in India when Sir Beauchamp Duff addressed you here a year ago, and those of you who were present will remember that he made it the subject of his address. At first sight the proposals for the Imperial General Staff presented certain features which could not find entire favour in this country, and the whole scheme was naturally the subject of very anxious deliberation at Army Headquarters. The apprehensions of the Government of India were fully stated in a despatch to the Secretary of State, and I am happy to be able to inform you that the most satisfactory assurances were received in reply.

The position of this College in especial has been fully recognised, and you need have no apprehensions as to any intention to deprecate or restrict its work, standing, or influence.

With the Imperial General Staff scheme was forwarded in draft the revised Army Order dealing with the organization of the General Staff at home, so that, in the words of the despatch, "a mutual organization suitable to both countries might be evolved." The chief differences between that draft and the previous orders consisted in the abolition of the "General Staff List," and a modification of the rules as to the accelerated promotion of General Staff officers, both of which I shall touch on later. These were both points on which Lord Kitchener had urged a modification of the original orders and the Government of India were thus able to accept the draft Army Order as the basis on which the General Staff should be formed in India. If any of you care to compare this home order, which was published last November, with the Indian Army Order just issued, you will see that they are practically identical except in one point as to which again I shall direct your attention later.

So far, Gentlemen, I have dealt with general principles. The discussion between the Home and Indian Governments having now cleared away all misunderstandings, and an organization mutually acceptable to both countries having been arrived at, as part of the general scheme for the Imperial General Staff, we can now turn to the practical steps taken to form the General Staff in India.

The foundation for this had already been laid by Lord Kitchener in the separation of the staff of divisions into the two branches of "Art of War" and "Routine" in 1904, and by the formation of the "Division of the Chief of the Staff," at Army Headquarters in 1906. But in spite of this the actual formation of a General Staff has entailed much anxious thought, and, as you know, considerable delay. In the first place, the pledge that no financial considerations should be involved, necessitated no change being made in the total number of staff officers in each grade throughout India. In the second, the great diversity of local conditions made it impossible to apply to all the so-called divisions and brigades a uniform organization based entirely on war requirements as was hoped and intended. Moreover, old prejudices die hard, and apprehensions however unfounded cannot be ignored. During these last few months, besides constant informal discussions, every army, division and independent brigade commander has been formally consulted, and their views have been the subject of the most careful consideration by the heads of the divisions at Army Headquarters concerned, *viz.*, the Chief of the Staff, the Adjutant General, and the Quartermaster General. The result of these deliberations, as finally approved by His Excellency the Commander-in-Chief and the Government of India, has been embodied in two Indian Army Orders issued last week, of which one deals with the formation of the General Staff, the other with the consequent reorganization of the Administrative Staff.

The first step was to review the distribution of duties at Army Headquarters in the light of the Imperial General Staff scheme, which had taken shape since the formation of the Division of the Chief of the Staff. Though generally in accordance with the

accepted principles there were some points of difference. For instance, certain matters connected with *mobilization* and *concentration* were dealt with by the Chief of the Staff, instead of by the Adjutant General and Quartermaster General respectively, while, on the other hand, the Adjutant General dealt with a portion of the *training*, which is a matter entirely in the hands of the General Staff elsewhere. As regards the latter, on the formation of the Chief of the Staff's Division, the duties were distributed at Army Headquarters in India on the theory that the General Staff was concerned only with the training of bodies composed of combined arms of the service, and not with the training of those composed of cavalry, artillery, or infantry only. To entrust, however, any part of the training of troops for war to a great administrative department which has enormous responsibilities of an entirely different sort, is to perpetuate a system which has in the past militated against success in the field. Moreover, if the distribution of duties at Army Headquarters had been maintained, it would have meant that the functions of the Indian General Staff would have differed from those assigned to the corresponding bodies elsewhere. It was, therefore, decided to adopt the distribution of duties laid down in Field Service Regulations, Part II, and *mobilization* will accordingly in future be dealt with by the Adjutant General, *concentration* by the Quartermaster General, and *all training* by the General Staff.

As far as army staffs are concerned, no change except in name has been necessary; for army commanders having no administrative duties to perform, have had no administrative staffs.

As regards divisions, the war staff laid down in "War Establishments" is:—

General Staff.

One general staff officer, 1st grade.

Do.	do.	2nd "
Do.	do.	3rd "

Administrative Staff.

One assistant quartermaster general.

One deputy assistant adjutant general.

Taking the latter first, we have got in the present routine staff all that is required, the A.A.G. becoming an A.Q.M.G. But in the General Staff we are not so fortunate. The A.A.G. "Art of War" becomes a general staff officer, 1st grade, but where are the 2nd and 3rd grade general staff officers to be obtained from? It is true that six of the divisions have staff captains, and it was originally intended to make these into the 3rd grade general staff officers, but as you will see later, this idea has had to be given up. There is, however a source from which the 2nd grade general staff officers can be found.

The normal war staff of a brigade forming part of a division is one staff officer, *viz.*, the brigade major. In India, however, in certain mixed brigades a D.A.A.G. has been allowed as well as a brigade major. These D.A.A.G's did not belong to the staff of the

war brigade and would not have accompanied it on service. Their position was therefore anomalous, and they have been utilised to provide the 2nd grade general staff officers of divisions. Their withdrawal from brigades will also, it is hoped, have the effect of restoring the office of brigade major to its proper place in general estimation. The presence of D.A.A.G.'s in brigades in India has certainly lowered the status of brigade majors, and the special provisions of the King's Regulations as to their rank and precedence have been generally ignored.

But at the same time the discussions which have taken place have shown conclusively the absolute necessity of giving a second staff officer to the larger mixed brigades. This staff officer will, however, in future be a staff captain, and he will be simply an assistant to the brigade major—for, except in the special cases of independent brigades and defended ports, the distinction between the different branches of the staff does not extend below the division.

Thus the administrative staffs of divisions will be complete as for war, and their general staffs will only be deficient of a 3rd grade general staff officer, while all brigades will have their brigade majors, and some a staff captain in addition. The latter however will *not* form part of the war brigade on mobilization.

But in India we have in addition to the ordinary brigades, the three independent frontier brigades, and also the so-called brigades at the defended ports of Aden, Karachi, Bombay, and Calcutta. The frontier brigades are independent bodies of troops of all arms, and therefore require a general staff officer. With them also questions connected with the Quartermaster General's Division form the most important portion of the administrative work on service as in peace, and the administrative staff officer will therefore be a D.A.Q.M.G.

The case of the defended ports, Aden, Karachi, Bombay and Calcutta, is to a certain extent analogous. Although termed "brigades," the really important point in their case is local defence. It is, therefore, in the first place, essential that there should be a general staff officer at each, specially charged with the duties connected with the defences. These are duties for which local knowledge is above all required. An officer, however gifted and highly educated, must be practically helpless until he has acquired the technical knowledge connected with armaments, electric lighting, communications, etc., and until he has made himself familiar with all the conditions of tides, channels, and landing places which affect the local problem of attack and defence. Moreover, he must be in the closest possible touch with all the local officials and the naval authorities; otherwise misunderstandings may easily arise, and offence be taken when none is intended, with fatal results. Secondary only in importance to the duties connected with defence are those connected with the embarkation and disembarkation of troops, and the considerations regarding local knowledge apply with almost

equal force to both. In their case also the administrative staff officer should therefore be a D.A.Q.M.G.

The large stations of Ambala, Secunderabad, and Bangalore stand in a category by themselves, in that they are the only stations at which there is more than one brigadier. Since the senior brigadier for the time being acts as general officer commanding the whole garrison, it is necessary that there should be a general staff officer to deal with the work of the garrison as a whole, distinct from the staff work of the individual brigades, which is dealt with by their respective brigade majors. It has, therefore, been decided to give each of these stations a 2nd grade general staff officer; and, in view of the very large garrisons of Rawal Pindi and Quetta, it has been thought desirable to extend this arrangement to their case also. In order, however, to prevent any misunderstanding as to the position of these officers with regard to brigade staffs, they will be appointed to the *divisional staffs* of the respective divisions, from which they will be detached for local duty at the discretion of the divisional commander.

This arrangement will ensure the return of these staff officers to the divisional staff whenever required—as, for instance, when the divisional commander himself visits the station for the purpose of carrying out the collective training of the brigades, and when the division is concentrated for divisional training, as well as on mobilization.

It now only remains for me to deal with the conditions of service on the General Staff. These, as I have already said, have been the subject of discussion between the Government of India and the War Office for some years past; and by mutual concessions an organization acceptable to both has now been arrived at. The qualifications for the General Staff, and the conditions of service on it, as now laid down for India in last week's orders are identical with those adopted at home, with one small exception. At home, owing to the South African War, there are a considerable number of officers who have had staff experience in the field. At home, therefore, the officers eligible to be sent to the Staff College for one year are limited to those who have shown themselves to be qualified by service on the staff *in the field*. In India the conditions are different, and therefore officers may be nominated for the year's course who have proved their value by work on the staff in peace.

So far for the new order; but the change of titles and even the redistribution of duties is not all. As pointed out by Lord Kitchener in 1907, a staff with the real qualifications of a General Staff cannot be found ready-made. The peace duties of a General Staff consist in the study of the Art of War, and the preparation of the troops and of themselves for the duties which will be required of them in war, in accordance with the conclusions derived from that study. General staff officers must therefore be constantly studying and practising the actual duties they would themselves have to

perform in war. If they do this we shall no longer hear, as we sometimes do now, that general staff officers "have nothing to do".

At the same time, although always remembering that the General Staff exists only for war and preparation for war, and not for the orderly and economical administration of the army in peace, yet we must carefully guard against any idea of the General Staff growing into a caste apart from the administrative staff. In the original memorandum by Lord Kitchener, forwarded in the despatch of 1907, the then Commander-in-Chief wrote as follows:—

"It is, moreover, necessary to discard as incorrect the view which has been somewhat widely held that a General Staff includes all officers of the army, however employed, who possess ability and training of a certain standard * * * the defects which have always proved fatal to it are the inevitable creation of a special and favoured caste within the army with separate interests of its own, and the eventual loss of all touch between this caste and the troops. The true theory certainly is that an officer belongs to the General Staff only when actually employed on General Staff duties * * * service in other departments of the staff is frequently a most valuable experience for an officer whom it is proposed eventually to employ on the General Staff, but it should be distinctly understood that during such service he is not a member of the General Staff."

The recent abolition of the "General Staff List" at home is in accordance with this view. Moreover, while the old regulations only laid down that—of the qualifications for the General Staff—"experience on the administrative staff, though not indispensable, will not be disregarded," the new order goes much further in stating that for the efficient performance of General Staff duties "a knowledge of the principles of the administration and maintenance of the army in peace and war" is required. That this theory is put into practice at home is shown by the fact that the Chief of the Imperial General Staff, and the Director of Staff Duties at the War Office, as well as at least two of the present brigadiers of the General Staff in commands at home, received their present appointments to the General Staff while serving on the Administrative Staff. The importance to general staff officers of experience in administrative work was, moreover, specially mentioned at the staff conferences both at home and in India in 1909.

I have been directed by Sir Douglas Haig to draw special attention to these points, because the discussions which have been held in connection with the formation of the General Staff have shown that there is in India a very wide-spread idea that the new organization will make a "distinct and permanent cleavage" between general and administrative staff officers. It is, therefore, my duty to impress most strongly upon you that the staff is all one, and that because you receive an appointment on the administrative staff one day, there is no reason why you should not subsequently serve on the general staff, and *vice versa*. And whichever you are

on, remember that the great duty of all staff officers, whether general or administrative, is to do their utmost to help regimental officers.

It is scarcely necessary for me here to enlarge on the value of the Staff College training, but I may perhaps say how much struck I have been at the growing desire there is on the part of divisional and brigade commanders to obtain Staff College officers for their staffs, and you may be sure that your interests will not be overlooked by the Commander-in-Chief, or by the Chief of the General Staff. Even the order that officers on leaving the Staff College must return to their regiments for a year, though I believe it has been thought hard in some quarters, is in reality in your own interests, and in that of the College itself. Experience shows that, now that the tenure of staff appointments has been extended to four years, the strain is too great if it comes directly on the top of the two years' hard work here, which has, moreover, probably been preceded by at least a year's preparation. Further, your presence with your regiments, fresh from your work here, should be the best possible advertisement of this institution.

But the value of a Staff College training is not only recognised in the army in India. The great Dominions have accepted the necessity of properly educated staff officers, and Australia has not only sent an officer to Quetta this year, but has just asked us if we can take another next year. Moreover, there are great openings for staff officers in the Dominions. We have just sent one, to Australia, and in selecting an officer from the many volunteers a Staff College training was made a *sine quâ non*. The Navy also is waking up to the necessity for the training, and any of you who have read the somewhat remarkable series of articles on a "War Staff for the Navy" which have just appeared in the *Times*, must have been struck by the very prominent position there given to the establishment of a Staff College as the central feature of the scheme.

In conclusion, it is a great pleasure to me to be able to announce to you, that in order to bring the Staff College into closer touch with the Army in India, the Chief of the General Staff proposes that the senior students should not only assist at the General Staff tour which he will hold next winter, but also that they should go on from that to the inter-divisional manœuvres between the 1st and 2nd divisions which the Commander-in-Chief has decided to hold. For these the two divisions will be completed as far as possible to their proper war organization, both as regards staffs and units, and their manœuvres should therefore form a most valuable lesson in the performance of staff duties in the field.

BATTLEFIELDS OF NORTHERN ITALY.

BY LIEUT.-COLONEL HON. E. NOEL.

XI.

GENOLA.

The battle of Genola is of scanty interest in comparison with those of the Trebbia and Novi, but it is the prominent incident in the events of the autumn of 1799, an understanding of which is necessary to connect the campaigns of that year with those of 1800-01, which were to bring the war in Italy to a conclusion.

On the departure of the Russian corps under Suvorov, Melas became Commander-in-Chief in Italy. Of his nine divisions one had been sent south into the Roman States, so that only eight remained available for field operations in the north-west, amounting to over sixty thousand men exclusive of garrisons.

Melas moved his centre, three divisions, to Bra*; his right consisted of two divisions about Turin, and one further north, facing the Alps; on his left was one division near Novi and one away towards the eastern Riviera.

The French Government joined the armies "of the Alps" and "of Italy" into one, under command of Championnet, who had formerly led an army to the conquest of Naples. The strength was about fifty thousand effectives. The old "Army of Italy," now six divisions, formed the right and centre, and was in the positions that it had taken up after the battle of Novi. The "Army of the Alps" had never been more than half formed, and consisted of only two divisions under Grenier and Duhesme, in the valleys leading into Piedmont from the west.

The problem with which Championnet had now to deal was similar to that which had confronted Macdonald and Moreau in the summer—to effect a junction on ground occupied by the enemy. In this case, however, the direction of the various parts would from the moment of starting be convergent, and the French still held possession of the fortress of Cuneo in the angle, forming a valuable *point d'appui*. The enemy's troops, moreover, were much dispersed. Success was then by no means out of the question; but to obtain it, it was necessary to move vigorously and concentrate quickly.

Instead of this, however, there were made a number of ill-connected movements of the various divisions all along the line; and

* *Vide* general map facing page 358.

in some cases a division, even small as it was, marched in more than one body. The Austrians, on the other hand, failed to make use of their central position to fall in force on the separated columns of their enemy, and confined themselves to driving each one back into the mountains.

These moves and counter-moves lasted for several weeks, resulting in many small engagements. A more important one occurred on October 23rd on the field of Novi, when three French divisions—of Watrin, Dombrowski and Laboissiere—under St. Cyr defeated the Austrian division stationed there and captured its entrenched camp at Bosco Marengo.

On November 1st, one of these divisions occupied Acqui. This caused Melas to resolve to withdraw with his main body from the neighbourhood of Cuneo to a position nearer Turin, just as Championnet was combining a fresh forward movement of his two left and two centre divisions. This led to the battle of Genola.

On November 2nd, Championnet's right division, Lemoine, occupied Mondovi and Carru; his next two, Victor and Grenier, effected their junction at Murassa on the Stura, while the left division, Duhesme, had already the previous day captured Pinerolo. On the 3rd the two central divisions advanced to near Fossano and Savigliano, and the left reached Saluzzo, while the right stood fast at Carru.

Melas at this time had some 30,000 men in four divisions stretching from Fossano to Marene, besides a detachment at Raconigi to connect with the division at Turin. With this force he decided to attack the French centre, hoping thus to prevent its junction with their left.

The French intended to continue their advance, feeling confident that the enemy was bent on retreat.

On the morning of November 4th, Grenier's division came into conflict with the two Austrian right divisions towards Marene, and Victor's with the two left divisions between Fossano and Genola. The former, much outnumbered, was after a brave fight driven back to Centalto. The latter made a stubborn resistance, but the defeat of Grenier enabled one of the two Austrian right divisions to join in the left attack, and Victor was forced to fall back to Murassa.

Meanwhile Duhesme, with only half his division, having left the other half at Saluzzo, seized Savigliano, and pushed on even further in rear of the advancing Austrians. To meet this, Melas sent a detachment of horse and foot from one of his right divisions; these, in conjunction with the flankers from Raconigi, came upon Duhesme near Marene, defeated him and drove him back along the Maira to the foot of the hills.

The Austrians now continued their advance to Centalto and Murassa, and next morning forced Victor and Grenier to take refuge under the walls of Cuneo.

During all this time, Lemoine's division remained inactive between the Stura and the Tanaro.

On the 6th the Austrians pushed on beyond Cuneo, and the French army was everywhere forced back into the mountains. In this battle the French lost 6,500 in killed, wounded, and prisoners; the Austrians only 2,000. The two divisions of Grenier and Victor, about 15,000, were opposed to double that number of Austrians, and Duhesme's 3,000 were likewise outnumbered by nearly two to one.

Melas here showed some skill in falling back and then using his central position to crush a portion of his enemy's force. Championnet made a sad mistake in leaving Lemoine's division isolated on the right bank of the Stura. He failed to act on the principle of concentration for battle.

At the same time as the battle of Genola, the Austrian left at Alessandria, which had now been reinforced to two divisions, made a forward movement, but, on November 6th, St. Cyr won another victory on the field of Novi, and repulsed this force again to Alessandria.

The few remaining operations of this campaign call for little notice. The Austrians took Mondovi, Acqui, Novi, and Gavi: exactly a month after the battle of Genola the fortress of Cuneo surrendered, the garrison—3,000 men—becoming prisoners of war, and before the end of the year the French had been everywhere driven over the Apennines.

Suvorov had put some vigour into the operations of this year, but, as we have seen, he was not allowed a free hand. It is to be observed that the only two great battles were due to the enterprise of the Russian general; otherwise the campaign was conducted on the orthodox system of the eighteenth century; the fortresses were duly besieged and the field operations were only secondary.

After the last fortress had been taken, the Austrian army went into winter quarters, intending to re-open the campaign next spring. In the following year, however, Italy was destined to see warfare of a very different character.

During the winter the French continued to hold Liguria, with outposts in the mountains. They suffered much from disease, to which Championnet himself fell a victim, much regretted by his men. Without pay, and wanting for food, clothing, medical stores, and in fact everything, the soldiers deserted in large numbers, and this army was reduced to a lower state of delapidation than it had been in during the winter of 1796 before Bonaparte took the command.

In less than one year the French had been expelled from the whole of Italy, except the narrow stretch of country between the mountains and the sea on both sides of Genola. The fruits of Bonaparte's brilliant campaigns of 1796-97 were all lost. The situation had become such that none but *he* could retrieve it. We shall see now how Bonaparte did his work.

XII.

MARENGO.*

In the autumn of 1799 Bonaparte returned from Egypt, and before the year's end he had become First Consul of the French Republic. The spirit of the great captain soon showed itself. The armies of the Rhine and of Switzerland were placed under one command—that of Moreau—so that the latter now became the right wing of the great army north of the Alps, which amounted to about one hundred thousand men.

Massena was sent to command the "Army of Italy" now reduced to below thirty thousand. In the centre an "Army of Reserve" was to be formed at Dijon, in a position to succour either the left or the right. The nucleus of this last was found in twenty thousand troops who in the foregoing year had been opposed to the Anglo-Russian landing in Holland and who were now set free by the pacification of La Vendée.

The commands of the armies of the North and the South were thus held by two of the best generals of France. That of the army of the centre, or "Reserve," was secretly destined for the First Consul himself. Here was a powerful array of military talent that foreboded great results.

Bonaparte paid special attention to the recuperation of the demoralised "Army of Italy" which he found once more in the same locality and in the same condition as it had been when, four years before, he was placed at its head and began his career as a commander. He addressed to it one of those stirring proclamations with which he knew so well how to appeal to the hearts and minds of his soldiers.

This army was reorganized, and formed into six small divisions; three on the right, under Soult, covered Genoa, and three on the left, under Suchet, covered the approaches to Nice. There were also two more very small divisions, guarding the Alps.

Opposed to this was the Austrian army in Italy, three times more numerous, composed of nine divisions. Three on the right were watching the Alps from Turin to the Lago Maggiore, three on the left threatened Genoa, and three in the centre, under Melas' immediate command, were in the theatre of his successes in the autumn with main body and head-quarters at Acqui.

The Austrians opened the campaign early in April 1800 by movements all along the line of the Apennines. They pierced the French centre and separated their two wings, and they also seized the Bocchetta Pass. Massena made valiant and vigorous efforts to reunite his divided forces, and gained some partial successes, but he could not prevail against the superior numbers of the enemy. After a fortnight's fighting the French right was driven under the walls of

Genoa, and Melas, leaving his left to blockade them there, turned with his main body against the French left, which he forced over the frontier. He occupied Nice, and on May 14th he reached the Var, which, since the days of the ancient Romans, had been looked upon as the boundary of Italy.

Some credit is due to Melas for these operations, which remind us of those of Bonaparte in the same theatre but in the opposite direction exactly four years before. He separated his enemy's two wings and then struck left and right with a central corps. He had indeed a superiority of over two to one, whereas Bonaparte had won with a force inferior to that of his enemy; he was also a long time in accomplishing his objects; all this makes his success much less brilliant, but he acted on sound principles.

It had taken the Austrians, helped by a Russian corps, nearly fourteen months to traverse North Italy from the Adige to the Var. It seemed now that they were about to invade France, whereas in one month more they on the contrary found themselves rolled back to the Mincio.

The French Commander-in-Chief, Massena, remained with the right half of his army. Now followed the celebrated siege of Genoa. The city was surrounded by a wall, and there was also an exterior line of works. The place is not a favourable one for defence on account of the rapid rise of the hills from the sea. The highest point in the outer line was over 2,000 feet, but there were still higher hills beyond. The garrison consisted of less than 10,000. The investing force was 25,000—four divisions spread over a line of 30 miles. The English fleet completed the blockade by sea.

Down to the middle of May Massena conducted an active defence, making frequent sorties. After this his soldiers were too exhausted for active operations. The large civil population, about 100,000, constituted a great difficulty. The French commander displayed great courage, fortitude, and constancy, and held out to the utmost extremity.

On June 4th when his provisions were completely exhausted he treated for a capitulation. The Austrians were only too ready to come to terms, because by this time the "Army of Reserve" had entered Italy, and the besieging forces were urgently needed elsewhere. On June 5th one remnant of the brave and famished garrison still able to walk, about 1,500 men with the Commander-in-Chief, were embarked with arms and ammunition for conveyance to Antibes, the nearest French port, while another of 2,000, under Gazan, marched out by land through Voltri.

If Massena had had provisions he would never have given the place up. The siege would probably have been raised where it was, and only ten days later occurred the battle of Marengo.

While the Austrian army was thus triumphing on the shores of the Mediterranean, Napoleon in his study at Paris was preparing the great stroke that was to undo all its conquests. Lying on the floor on a spread-out map, and measuring the distances with his

compasses, he made his calculations, and placing a finger on the plain between Alessandria and Tortona, he turned to Berthier and said, "Here, in the middle of June, will we settle the fate of Italy."

On this plain is a small village called "Marengo" which gave its name to the battle fought on the 14th of June.

There was much talk made in the French Parliament as well as in the newspapers about the "Army of Reserve." A grand review was announced, to which some foreigners were allowed access. All that appeared on parade were a few old soldiers past active service and some raw conscripts: it became spread over Europe that the vaunted "Army of Reserve" was a sham with which the First Consul was trying to play the game of bluff. Immediately after this the real "Army of Reserve" began to assemble at Dijon.

By the new constitution the First Consul of France was not allowed to command in person. He had therefore to throw dust in the eyes of his own countrymen as well as in those of Europe. He had the various Alpine passes surveyed, but he had already conceived a preference for the Great St. Bernard, owing partly to its geographical position but also to the common belief prevalent that it was impracticable for an army with artillery.

He set out from Paris on May 6th "to review the Army of Reserve," and passing through Dijon arrived on the 8th at Geneva, where he made a show of taking a house as though he intended to direct from there the armies operating in the Alps and on the coast. At this time Suchet was being forced back towards Nice, Massena was closely besieged in Genoa; the small divisions in the Alps were holding the passes.

Meanwhile the troops were directed on Lausanne, and thence up the Rhone valley on Martigny. The lake of Geneva was utilised for the conveyance of stores. At Lausanne the First Consul reviewed the first corps, which, it was pretended, was to be sent into the Valais as a reserve to the right wing of the "Army of the Rhine." It was in reality the advanced guard of the new army of Italy: it was commanded by Lannes.

Napoleon's plan was to move his army over the Great St. Bernard, and small forces over several other passes at the same time, so as to leave the enemy in doubt as to which way the main body was coming. On the extreme left a division of 10,000 under Moncey from the "Army of the Rhine" was to cross by the St. Gothard. This army had won victories at Engen and Moeskirch on May 3rd and 5th and was therefore now in a position to make the required detachment.

From Martigny on the Rhone to Aosta on the Dora Baltea is a distance of forty-five miles. There was a road practicable for wheeled traffic on the north side as far as Bourg St. Pierre twenty miles, and on the south side from Etroubles to Aosta ten miles. On the middle fifteen miles there was only a mule path. It is only within the last few years that a carriage road has been completed over this pass.

As is always the case in the Alps, the slope is steeper on the south than on the north side. At the top is about a mile of flat, with a small lake, at the north end of which, and within the frontier of the Valais, stands the famous monastery and hospice, 8,100 feet above sea-level. Winter reigns here for nine months in the year. In the summer come crowds of hungry visitors to avail themselves of the hospitality of the monks. During the winter some travellers pass and a few adventurous trippers on snowshoes. The monks themselves are very skilful in the use of these (*skis*) and go out every day on them as a kind of drill, carrying food and restoratives, and accompanied by their dogs. At Bourg St. Pierre in the village inn known as the *Déjeuner de Napoléon* is still preserved the room in which the First Consul had his breakfast, as is likewise that in which he rested at the hospice.

The passes of the Great and Little St. Bernard are on opposite sides of the Mont Blanc mass, where the main chain of the Alps changes direction from north to east, so that the former is a north and south, the latter an east and west, pass. It was by the latter that Hannibal probably made his passage.

The valley of Aosta where the two roads join, and which although Italian by geography is French in speech, is completely enclosed by mountains. The narrow exit at its eastern end was in bygone ages closed by a huge landslip. Through this obstruction the Dora Baltea has torn for itself a way affording just room enough for a road beside the river. On this ancient landslip is built the Fort of Bard completely commanding the passage. It will be easily understood then how unlikely it would seem that an army would dare to come by this route. Hannibal crossed in the autumn but he had no wheeled artillery to move and no Fort of Bard to block his way. Napoleon crossed in spring by a much higher pass, at the season of melting snow and avalanches.

Napoleon had gun carriages on runners constructed in Paris, and furthermore trunks of trees were hollowed out, inside which guns were hauled, the carriages being dismounted and carried on mule-back. The ammunition and stores were packed on the sledges of the country drawn by peasants or by the soldiers themselves. Lanne's corps crossed the pass on May 17th and the rest of the army followed day by day. Every soldier received some refreshment at the hospice.

Napoleon himself crossed on the 20th, and on reaching the valley found all progress stopped by the Fort of Bard. He however was not the man to be thus easily foiled. A mountain path round the fort was found, by which the infantry and also the cavalry made their way. The artillery was rushed past the fort in the night, the wheels wrapped round with straw and the road strewn with litter to deaden the sound, in spite of which precautions the garrison became alarmed and caused some loss by their fire. An attempt to escalade the fort failed, and the siege was entrusted to the division which came by the little St. Bernard.

The advanced guard seized Ivrea on the 23rd. The army was gathered there on the 27th. Its strength was 38,000 divided into four small corps under Lannes, Victor, Murat and Duhesme. Other columns aggregating 9,000 crossed by the Mont Cenis, the little St. Bernard, and the Simplon, and as already mentioned a corps of 10,000 by the St. Gothard. Thus the total that the First Consul brought into Italy was 57,000.

In the foregoing campaigns there had been a tendency to group two or three divisions into a larger command. In this year, both the "Army of the Rhine" and the "Army of Reserve" were formed in corps of two or three divisions, but these units were much smaller than they became later on.

We must now return to the Austrian army in Italy. To oppose this new irruption over the Alps there was in Piedmont the Austrian right wing, which had taken no part in the operations against Massena. It consisted of three divisions, 28,000, under Kaim, whose headquarters were at Turin. Melas left one division made up of 18,000, under Elsnitz, to hold Suchet's 12,000 on the Var, where the French still held the bridge-head, and hastened himself with 10,000 to Turin. At Cuneo on May 24th he heard the first rumours of Bonaparte himself being in Italy; he would not believe this, and sent his reinforcements towards the Mont Cenis, while some had already been directed to the Lago Maggiore. Arrived at Turin he heard on the 27th that Lannes' corps was on the banks of the Po at Chivasso, whither it had advanced driving before it the various portions of Haddick's division, one of the three under the control of Kaim.

At this time Melas had around Turin 28,000 men—one division was away near the Lago Maggiore—there were 25,000 besieging Genoa, and 18,000 on the Var. He was master of the whole area within this triangle, and so there was nothing to prevent his concentrating from the three fractions a mass of 60,000 with which he could have sought the French army and fought a battle with a considerable superiority of force. He did not however as yet realise the extent of the danger that threatened him.

Bonaparte, using Lannes' corps as a screen, moved the rest of his army eastward, crossed the Ticino at Turbigo on May 31st, occupied Milan June 2nd, effected his junction with Moncey, and spread as far as Brescia and Cremona. The Austrian division on the Lago Maggiore saved itself by a flying retreat and took refuge in Mantua. On June 1st the Fort of Bard surrendered; Chabran's division (from the Little St. Bernard) replaced Lannes on the river Po, and Lannes moved to Pavia, where he captured vast stores of provisions and munitions of war. Bonaparte had now collected his army in Lombardy.

His reasons for moving east rather than attacking the Austrians around Turin are easily discerned:—

(1) To effect the junction with Moncey:

(2) To seize the Austrian magazines, for the French could have brought but little with them over the Alps:

- (3) For sake of the moral effect likely to be produced in Italy by the sudden appearance of the First Consul in the capital of Lombardy.
- (4) To cut the Austrian's communications, to hem them in between the Alps and the sea, and make them fight a battle in such conditions that defeat must be disastrous.

On May 31st Melas at last issued orders for a concentration of all his forces on Asti and Alessandria, but he consented to the left wing standing fast for a few days outside Genoa, the fall of which place was known to be imminent. It occurred as already stated on June 4th. This short delay had serious consequences.

In the meanwhile Elsnitz's division on the Var, after being repulsed in attacks on the bridge-head on May 22nd and 27th, had been itself attacked by Suchet, and after several days' fighting was driven over the mountains. It arrived at Ceva on June 7th reduced from 18,000 to 8,000. Suchet pushed on along the coast in hopes of relieving Genoa, and on his way met Gazan's 2,000 men on June 8th at Finale.

The disaster to this wing caused Melas to remain near Turin until June 8th. He now considered Piacenza, (which was held by an Austrian garrison) with its passage over the Po, to be the critical point, and thither he had directed from Genoa one division by way of Bobbio and two by way of Tortona (one being left to occupy the place), from Turin two divisions, and from Ceva one by way of Asti and Alessandria. One division remained to garrison Turin and to face the Alps. It was however already too late. The delay around Genoa and Turin had been fatal.

Bonaparte, after entering Milan, had swung to the right, and on the 7th captured Piacenza, while other troops had crossed the Po higher up and seized the defile of Stradella, the military importance of which was pointed out in the article on the Trebbia. On the 9th at Montebello, by Casteggio, he encountered the two Austrian divisions coming from Genoa through Tortona under Ott. These were defeated with heavy loss, and retired across the Scrivia and the Bormida.

It was only now that Bonaparte became aware of the fall of Genoa and of the situation of affairs on the coast. During the next two days he secured his position by building two bridges over the Po with material captured from the enemy, and by gathering his forces near Casteggio. At the same time he sent orders to Suchet to come down the valley of the Bormida from Finale. On the 12th he advanced to Voghera.

A new corps of two divisions was now formed for Desaix who arrived from Egypt, and the cavalry was grouped into one under Murat. Bonaparte had now with him 24,000 men in three corps under Lannes, Victor and Desaix, and 4,000 cavalry under Murat. Moncey's Corps and Duhesme's—reduced to one division—were holding Lombardy; the small column from the Simplon blockaded Arona; the division from the Little St. Bernard was guarding the

communications; that from the Mont Cenis had not issued from the mountains.

Bonaparte's reason for leaving so many troops in Lombardy was lest Melas should attempt to break away north between his army and the Alps. Thus, of his total that had crossed the Alps he had only one-half at hand for the great battle that was coming. He also felt anxious lest Melas should make his escape to Genoa, whence he could move into Tuscany or use Genoa itself as a base with the help of the English fleet.

It was on account of this fear that, when on the 13th he crossed the Scrivia and found only a few cavalry between it and the Bormida, he detached Desaix with one of his divisions, 5,000 men, to Rivalta. At the same time he sent orders for one of Moncey's divisions to come down from Pavia to join him. Intelligence received during the night however, led him to believe that Melas' main body lay behind the Bormida; he accordingly pushed his troops onward towards that river and sent to recall Desaix from Rivalta. It was the timely arrival of this division on the field that decided the issue of the battle next day.

Of Melas' army, one division had, as we have seen, been driven away to Mantua, one from Genoa was in the mountains of Bobbio, one was in Genoa, and one at Turin, besides other troops in sundry garrisons. The five divisions that remained numbered after the losses they had suffered little more than 30,000, of whom 8,000 were cavalry, with 200 guns. They were reorganized for the battle into six divisions of which two were wholly cavalry. The Austrians held a bridge-head where the high road from Tortona and from Novi crosses the Bormida, and on the evening of the 13th they here repulsed the advanced guard of the leading French Corps, Victor.

The field of Marengo needs little description, being a level plain. Unlike most of North Italy, it is not grown over with fruit trees and cut up by irrigation ditches, and is quite favourable for cavalry action: in this arm the Austrians had a superiority of two to one.

On the night before the battle Victor's Corps, about 9,000, were in and around the village of Marengo; Lannes' Corps, only 5,000, a little further back north of Spinetta; Murat with the cavalry near S. Giuliano; Desaix, as already stated, had gone to Rivalta with Boudet's division, while his other division under Monnier (formerly part of Duhesme's Corps) was at Castel Nuovo. The First Consul himself was at Torre Garofoli but he had sent on his small Consular Guard to the farm of Poggi just in rear of Lannes' Corps. There were therefore only 15,000 men with 40 guns to meet the first onset of double that number of Austrians with 200 guns, but these had to debouch from a single bridge-head, and the French cavalry being only five miles away could come up over the open country as quickly as that of the Austrians could defile over the bridges.

Melas' intention seems to have been to send one strong division of somewhat over 7,000 under Ott towards Sale, and with the remainder under his own command to sweep round by Spinetta and

S. Giuliano towards the same point, and having defeated whatever French troops he might come across then to make his way towards the river Po.

His own command consisted of three divisions, Haddick, Kaim, and Morzin—from right to left—16,000 of all arms with one of cavalry on either flank, 3,000 under O'Reilly on the right, and 4,000 under Elsnitz on the left; Ott's made the sixth division.

The Austrian army began its movement at daylight on June 14th, debouching right in front from the Bormida bridge-head. The deployment took several hours, during which Victor held on stoutly to the village of Marengo, the defence of which was helped by a muddy ditch running between it and the Bormida. Lannes' Corps came into line on his right and Murat on his left. Kellermann made more than one successful charge.

It was not until the whole Austrian army had come into action, including Ott's division (which had reached Castelceriolo and then wheeled to the right) that the French were driven out of Marengo. Lannes' Corps was now in a critical situation. At this juncture Bonaparte himself arrived on the scene and at once launched the Consular Guard, only 800 men, against Ott, and so covered the retreat of Lannes.

Shortly after this, Monnier's division from Castel Nuovo (nearly 4,000 men) came on the field and was ordered by Bonaparte to take Castelceriolo. This order was carried out by one demi-brigade; another joined the Consular Guard in covering the retreat of Lannes, while a third was held back as a last reserve. Ott had to detach one of his brigades to retake this village. The opportune arrival of this division checked the victorious advance of Ott and disengaged Lannes. The French army, however, was now in full retreat, and now would have been the opportunity for the superior Austrian cavalry.

That cavalry was not forthcoming. About 9 o'clock one brigade of over 2,000 had been withdrawn from the battlefield and sent away towards Acqui owing to reports of the approach of Suchet's division from the coast. O'Reilly's cavalry division had been in action since the early morning and seems to have been now occupied in picking up stray prisoners. The rest had been severely handled by Kellermann, Champeaux, and Rivaud, Murat's three brigadiers.

The French were able to retreat in fairly good order on the two villages of S. Giuliano. Melas, who had been slightly wounded, considering the battle won, left the pursuit to Zach, his C. S. O., and to Kaim, and himself returned about 2 o'clock to Alessandria to report his success. These two generals formed most of their troops into column of route and proceeded along the high road towards S. Giuliano Vecchio, extending to Cascina Grossa on the right and flanked on the left by Ott's division on the road leading from Castelceriolo to S. Giuliano Nuovo.

The cross road running from S. Giuliano Vecchio to Filippona would fairly represent the position of the French army in their

retreat across the open country when, towards 4 P.M.; the head of Desaix's column appeared, approaching the former of these two villages: he seems to have marched from Rivalta by way of Torre Garofoli. The First Consul ordered the backward movement to be stopped; he rode along the front speaking encouraging words to his troops, and the enthusiasm with which these were received shows that the spirit of the army and their confidence in their leader were still unshaken.

The head of the Austrian advanced guard nearing S. Giuliano Vecchio was suddenly held up by the fire of twelve masked guns; immediately after, Desaix's division issued from the village carrying along with it what remained of Victor's Corps, and with Murat's cavalry on its right. Desaix had three demi-brigades, and he attacked with one deployed in line and one in column on either flank.

The Austrian advanced guard under Zach consisted of two brigades. The first of these was at once overborne, but the second stood firm: a charge of Kellermann's cavalry brigade on their left overthrew this brigade also, and most of them including Zach himself were taken prisoners. This charge, which had an important effect on the history of modern Europe, took place near the farm of Milana. Kellermann continued his onward career: the Austrian main body under Kaim was driven back before it had found time to deploy, and there followed a general rush for the bridges.

The Austrian reserve, of their 4th division, offered some resistance near Spinetta, supported on its right by O'Reilly's cavalry, which, instead of following up the French in their retreat, had diverged towards Frugarolo. This reserve retired on Marengo. About 7 P.M. the French left, Boudet's division and Victor's corps, recaptured this village, and later on recovered all the positions that they had held in the morning.

Meanwhile Ott on the Austrian left had been likewise obliged to retire; he fell back through Castelceriolo pursued by Lannes and Monnier. The Austrian reserve with O'Reilly's cavalry continued to cover the retreat until 10 P.M. by which time the whole army had recrossed the Bormida, when they themselves withdrew and destroyed the bridges.

Counting out the brigade of cavalry sent towards Acqui, the forces engaged were equal, 28,000 on each side, and on each side the killed and wounded were 7,000, or one-fourth. This indicates severe fighting: at St. Helena Napoleon said that the Austrians fought better at Marengo than in any other of the battles in which he had met them. Besides this the French lost 1,000 prisoners, the Austrians 3,000 prisoners and 25 guns. Desaix was killed immediately after coming into action: there is a tablet to his memory in the church at the hospice of the Great St. Bernard.

Such was this remarkable battle, remarkable for its strategic value and political importance, and also for the peculiarity of its principal incidents. It is to be observed that—

1. Both armies fought facing their own rear.

2. An army of 30,000 deployed for action through a single gateway.
3. When the flank of one army was turned, its reserve was thrown in *outside* the turning movement.
4. The superior cavalry of the then winning side was unavailable when most wanted.
5. The pursuing army on an open plain formed into column of route.
6. Their Commander-in-Chief left the field to report a victory not yet won.
7. The arrival of 5,000 fresh troops turned victory into rout.

Bonaparte's action in sending Monnier's division to Castelterziolo has been censured on the ground that its direction was eccentric. It must be remembered firstly that this division came up on the right rear. When Bonaparte arrived on the battlefield, Ott had already got round the French right flank: a successful turning movement here would have been fatal to the French army, driving it back on Novi and Genoa away from its line of retreat: it was all important to prevent this, and Bonaparte succeeded in doing so. The direction of Monnier's action was indeed eccentric topographically, but tactically it was a brilliantly bold stroke: it thwarted the outflanking movement, enabled the French army to retreat perpendicularly, and helped to gain the time necessary for Desaix's division to come up.

A considerable share in the First Consul's success on this day must be attributed to the sound and true conduct of his lieutenants. Massena by his protracted defence of Genoa prevented the besieging forces from reaching the Stradella defile and Piacenza before the "Army of Reserve." Suchet by his bold offensive reduced the Austrian strength by ten thousand and delayed their concentration, and further by his move on Acqui drew off a portion of their forces from the battlefield.

The detachment of a brigade of cavalry towards Acqui was a great mistake. This town is over twenty miles from Alessandria, and Suchet did not arrive there till the next day, but even if he had been nearer, it was all important to defeat Bonaparte, and after having done so it would have been time enough to turn against Suchet. The absence of this brigade from the battle must be counted as one of the causes of the Austrian defeat.

Melas' own conduct in leaving the field as early as two o'clock seems strange beyond comprehension, unless we attribute it to his wound. Even if the victory were won his work was not half done; the French army though driven back still blocked the way to Piacenza. In the situation in which the Austrian army was at this time it required not merely the defeat but the destruction of Bonaparte's army to reopen communication with Austria.

It has been already noticed that Bonaparte had only half his troops at Marengo. Melas had less than this, about one-third. The rest had been cut off by the rapid movements of the French or were

taken up in garrisons. The loss of the battle entailed the loss of all the places garrisoned.

On the morning after the battle the French were about to attack the Bormida bridge-head, when they were met by a flag of truce. On the same day was signed the Convention of Alessandria. By this, the Austrians were to evacuate at once the whole of North Italy as far as the Mincio, keeping however Ferrara, Ancona and Tuscany; the French were to advance as far as the Chiese; all the strongholds within this area were to be given up, three fortresses (of which Genoa was one) and nine forts or citadels; the Austrian garrisons were to march out taking with them a certain quantity of provisions and as much artillery as was their own; all the rest was to be surrendered. The armistice afterwards ratified lasted until the late autumn.

Thus were the conquests of over a year's campaigning and sieging all lost by the cornering and defeat of the field army.

This campaign is one of the most brilliant in history. An army nearly forty thousand strong was, quite unbeknown to the enemy, brought over a mountain pass where there was no road, and the exit from which was blocked by a fort. This army then used its enemy's ammunition, fed on its enemy's stores, crossed rivers with its enemy's pontoons. While keeping its own line of retreat it forced its enemy to fight with no retreat left, and by a single defeat made him relinquish what it had taken him more than a year to gain.

The political results were equally far reaching. By assuming command in spite of the Constitution, Bonaparte risked his whole future and we may justly say that on the field of Marengo he won the new Empire of the West.

The short campaign that followed the expiration of the armistice, with the battle of the Mincio on Christmas Day, was noticed in Article VII—Verona (*vide January Journal*, 1907). The operations in Italy in subsequent years briefly referred to in Article VI—Tagliamento (October 1906) were secondary to the greater ones carried on at the same time in Central or Northern Europe. Marengo marks Bonaparte's last appearance in Italy at the head of an army.

The great lesson that Napoleon taught the world was the paramount importance of defeating and destroying the enemy's field army, and that all fortresses must of necessity become the prize of the army that is victorious in the field.

In 1796 he raised the siege of Mantua, abandoning even the whole of his siege artillery, in order to be able to defeat the field army, and, throughout his time on the Mincio and the Adige, he watched the fortress with a force smaller than the garrison, keeping all he could for field operations.

In 1800 he had the reverse problem to solve—the relief of a besieged fortress—and here again he showed that the surest way to do this is not to butt straight at it, but to strike at the field army. In this case the fortress actually fell, but its capture proved a

misfortune to its captors, and only ten days later, after a victory in the field, he recovered not only this place but eleven more besides by a stroke of the pen.

It is noteworthy that in spite of this lesson the present century has opened with a great war characterised by the disregard of Napoleonic principles; a war in which field operations were made subordinate to the siege of a fortress, in which, slow and methodical movements, the use of entrenched positions on a vast scale, the absence of pursuit after victory, carry us back to the warfare of the eighteenth century.

On the other hand it is pleasant to note that, exactly one hundred years after Marengo, the Napoleonic maxim was put into practice by a British general; when Lord Roberts relieved the beleaguered garrison of Ladysmith, not by an advance upon the place, but by a blow aimed from another direction at the enemy's field army; and, if the cavalry had clung to the skirts of that army, instead of going on a visit to the Diamond City, he would have won his Marengo on the plain north of the Modder river on the 16th of February.

Many of the scenes of the campaigns of 1799 and 1800 fall within the view of the modern traveller to India *via* Brindisi.

After coming through the Fréjus tunnel (commonly miscalled the Mont Cenis tunnel) he may be traversing the same valley along which Hannibal entered Italy with his elephants.

Between Turin and Alessandria he follows the same route as Suvorov and Melas, by which the former in 1799 marched to victory on the Trebbia, the latter in 1800 to disaster on the Bormida. Alessandria, an important railway junction, is still a fortress commanding the passage of the Tanaro and Bormida. The railway crosses the latter river more than $1\frac{1}{2}$ miles above, i.e., south of, the Austrian bridge-head and then turning east skirts the southern edge of the field over which Austrians and French alternately advanced and retired on the eventful June 14th, 1800.

The small village of Marengo lies among trees a mile north of the railway and further back can be seen Castelcerriolo. Half-way between the stations of Spinetta and S. Giuliano, the farm Milana is passed on the left, the scene of Kellermann's decisive charge, and on nearing the latter station we pass over the very ground where Desaix came into action and changed the fortune of the day.

At the same time far away to the south can be descried Novi, the scene of Suvorov's victory on August 15th, 1799. Novi is a station on the line to Genoa.

East of S. Giuliano and just on the right is Torre Garofoli, the hamlet where Napoleon slept the night before the battle. Three miles south of this lies Rivalta. The Scrivia is then crossed, and soon after comes Tortona which figured largely in 1799; later on Casteggio, the ancient Clastidium, Hannibal's "granary," and hard by Montebello, where Bonaparte stopped the Austrians from Genoa five days before Marengo, and where also occurred the first engagement in the war of 1859.

A little further on the railway threads the Stradella defile and then crosses the Tidone, the Trebbia, and the Nure, the site of the fierce four days' fight of French, Austrians, and Russians as well as of the more famous victory of Hannibal over the Romans. The railway in this case skirts the north edge of the battlefield. Piacenza is a fortress with extensive works on both sides of the Po.

Proceeding eastward the traveller runs parallel to the road along which the French and Austrian armies marched and counter-marched in 1799, and up which Consul Sempronius led his legions from Rimini to join Scipio in the year B. C. 218.



NAPOLEONS CAMPAIGN OF 1814 IN FRANCE.

A lecture delivered at Jubbulpore.

By MAJOR W. E. DICKSON, R.E.

The Campaign of 1814 in France was the last of the series of campaigns forced on Napoleon in defence of his empire, and eventually of his throne and dynasty, when Europe, after the disasters to his army in Russia in 1812, finally plucked up courage to combine against him. The campaign may thus be said to constitute the final act of that extraordinary drama in which a single man is seen, by the force of his military genius, to hold in bondage the greater part of the princes and states of Continental Europe.

As a study in the art of war, this campaign has long been regarded on the Continent with very great interest, containing as it does, amongst other lessons, a very remarkable example of how to carry out one of the hardest tasks that can fall to the lot of any soldier, viz., to hold one's own against an advancing enemy who is far superior in numbers. In it we see this problem tackled by the greatest general the world has seen, and by him at a time when his efforts to save France and his dynasty from impending ruin are generally considered to have brought out his talents in a degree unsurpassed on any previous occasion. It is strange, under these circumstances, to find that among the large quantity of literature published in England on the Napoleonic campaigns, there is so little devoted to this particular one, and we are in consequence obliged to have recourse to foreign publications for details of this most interesting period of military history. The sketch of it which is being offered in this paper is an attempt to present, in a very brief and condensed form, the substance of one of the best known foreign works on the subject, that of Clausewitz.

The campaign covers the period from the 1st January 1814, when the allied forces of Russia, Prussia, and Austria, crossed the Rhine,—at that time the frontier proper of France,—till the 31st March, when the entry of the allies into Paris brought about the fall of the Napoleonic dynasty and the end of the war. In this paper it is proposed first to run through, without comment, the course of events during the campaign, and then afterwards to draw attention to some of the principles of warfare exemplified by the operations, and some of the lessons to be derived from them.

A few remarks are, however, first necessary on the country over which the operations took place, as some of its features had a considerable influence on the course of events. Sketch No. 1* shows very

* *Vide* end of article.

roughly the theatre of war, which may be said to comprise the country between the Rhine on the east and a north and south line through Paris on the west. It will be noticed that the eastern half of this area differs materially in character, being generally hilly and broken, from the western half, which is, in the main, a flat plain.

Taking first the eastern half of the area, its most prominent features will be seen to be a series of alternate ranges of hills and large rivers, whose general direction is parallel to, and therefore constituting military obstacles against, the advance of an invader from the east. These obstacles are first the line of the Vosges and Hardt mountains, then the rivers Moselle and Meuse, and the hills on each side of them.

From the south-west extremity of the Vosges, jutting out to the west, is a belt of high ground which forms the watershed between the rivers flowing northwards into the North Sea and those whose waters drain southwards into the Mediterranean. From the south-east extremity a low neck or coll joins the Vosges to the mountains of Switzerland and forms the parting between the waters of the Rhine and those which flow to the south.

The most direct route from the centre of Germany to Paris lies across the middle Rhine, and thence past the neighbourhood of Metz and Chalons. Any advance of an invader by this line would, however, involve crossing at right angles that series of obstacles we have seen to exist in this part of the country. By making a detour to the south, however, crossing the neck between the Vosges and Switzerland, and then following the line of the watershed which runs to the west, not only can the Vosges and the other hill ranges be avoided, but those rivers which form formidable obstacles further north can be crossed near their sources where they are but insignificant streams. By adopting this line of advance, therefore, as Schwartzenberg did with the bulk of his forces in 1814, it was possible for him to get into the heart of France without having to force a series of mountain passes and river crossings, and force them too in the face of a man of the stamp of Napoleon.

Turning now to the other, the western half of the theatre of war, we find the country is generally flat and level, and is watered by a series of rivers whose general direction, instead of being north and south, is mostly east and west. The most important of these for our purpose are the Seine and the Marne, which flowing westwards unite just east of Paris. Their course may be compared to a two-pronged fork of which the handle lies to the west, and the prongs to the east, of Paris. Roads from the frontier towards the Capital ran both inside the prongs of this "fork," and to the north and south of it, and at the time of year the campaign took place—the depth of winter—the state of the country was such that any movement of troops off the high roads was a matter of considerable difficulty. When we remember this and also the fact that the Seine and Marne were impassable except at the regular bridges, which were not numerous, we see of what very great importance this feature, the "two-pronged fork", became to an army defending Paris.

Small bodies could be safely left to hold the bridges over the Seine or the Marne, and thus protect the flanks and rear of the defending army, while that army itself concentrated against any portion of the invading enemy which happened to find itself cut off from the remainder by the rivers forming the "fork." We shall see to what an extent Napoleon turned this feature to his advantage during the course of the campaign.

Before proceeding to the events of the campaign itself, it will not be out of place to allude briefly to the occurrences which led up to the situation at its commencement.

Before the expedition to Russia in 1812, Napoleon may be said to have been at the zenith of his power, and the "Grand Army" which he collected for that campaign included contingents drawn from almost every nation on the continent. This army, with the exception of the Prussian and Austrian contingents which went over to the enemy as soon as things began to go wrong, and also some of the other non-French components, was practically wiped out during the expedition. Of the 250,000 Frenchmen originally included in it, barely 1,000 reached Königsberg at the end of the retreat from Moscow. That was in December 1812. By the summer of 1813, such was his almost superhuman energy, Napoleon had succeeded in collecting in Germany a brand new army of nearly 300,000 men with which to take the field against the forces that Russia, joined now by Prussia and Austria, was sending against him. An army of such recruits, deficient in properly trained cavalry, was, however, even in the hands of a Napoleon, but a poor weapon with which to contend against the overwhelming forces the allies were able to bring against it. Notwithstanding several victories over the forces of the allies, the French were eventually obliged to retire to the neighbourhood of Leipsic, where, in September 1813, being nearly surrounded, they suffered a very serious defeat. A retreat to the French frontier was now the only course left open to Napoleon. The Rhine was reached by the French forces, reduced now to some 60,000 men, in November 1813. Here an outbreak of typhus still further depleted the French ranks, leaving them for the 1814 campaign with little else but the raw recruits which kept continually coming in, squeezed from the population of France. The allies, after the battle of Leipsic, followed the French very leisurely, and did not reach the Rhine till the end of December. This brings us to the situation as shown on sketch No. 1, when the campaign we are considering, may be said to commence.

On reaching the Rhine, Napoleon entrusted the defence of the line of that river to three of his marshals, while he himself went on to Paris to arrange for fresh levies being raised for the defence of the country. Macdonald with 22,000 men was told off to guard the lower course of the Rhine, Marmont with 20,000 its middle course, and Victor with 14,000 the upper part of the river. In addition there was Ney with 10,000 in Lorraine, and Mortier with 12,000 opposite the Swiss frontier, while Augereau with a small force

was busy raising fresh levies in the neighbourhood of Dijon. These were all mobile field troops. There were also some 30,000 inferior troops told off as garrisons for the fortified places along the Rhine and in Lorraine. The total French forces in this part of the theatre of war numbered, therefore, some 80,000 field and 30,000 fortress troops, and such was their distribution at the end of December, before the allies crossed the Rhine.

The allies advanced towards the French frontier from two directions. Schwartzemberg, who was by way of being Commander-in-Chief of all the allied forces, moved towards the upper Rhine with the Austrians, the South Germans and the bulk of the Russians, some 200,000 men in all. Blücher with 65,000 Prussians marched towards the middle Rhine, and was followed by some other Prussian and Russian corps, which did not, however, arrive till later on.

The French marshals, hopelessly outnumbered, and with their forces scattered along such an extended front, were not in a position to dispute the passage of the Rhine by the allies, which was effected with but slight opposition during the early days of January 1814. Schwartzemberg's army crossed between Fort Louis and Schaffhausen. Two corps were left on his right flank to invest the Rhine fortresses as far as Strassburg. Another corps under Bubna was sent south, through Switzerland towards Lyons, to guard his left flank, while two more corps were left behind, as a reserve, east of the Rhine. Schwartzemberg himself with the remainder, reduced by these detachments to 100,000 men, marched in two columns, directed respectively on Belfort-Vesoul, and on Besançon. They moved thence by Langres and Chaumont on Bar-sur-Aube, the point where Schwartzemberg informed Blücher he wished to effect a junction with him. Blücher crossed the Rhine between Coblenz and Mainz about the same time as Schwartzemberg did further south. He had, however, to leave the bulk of his troops to mask the French fortresses on the middle Rhine and in Lorraine, and the force with which he eventually moved on to meet Schwartzemberg numbered barely 20,000 men.

The French marshals along the Rhine were obliged to retire before the allies. Victor and Marmont who had been watching the upper and middle course of the river respectively, fell back on Ney's corps in Lorraine. These three marshals then together moved in a southerly direction towards what now appeared to them the direction of the enemy's main forces. Schwartzemberg's circular movement south of the Vosges threatened, however, their flank, and they retreated towards the valley of the Marne. Mortier with his corps fell back slowly before Schwartzemberg's advance, keeping touch with him. Macdonald remained longer on the Rhine than the other marshals, watching a fresh Russian corps arriving from the north. As soon as these crossed the Rhine, he retired by forced marches past Mezières, to join the other marshals in the Marne valley.

The above movements took up the greater part of January 1814, during which time no fighting of importance took place. They

bring us to the situation at the end of that month, shown on the next sketch, when the first serious collision occurred.

Sketch No. 2 shows the position of the opposing forces on the last day of January. On the 26th of this month Napoleon himself had arrived from Paris with reinforcements and joined his marshals at Vitry in the Marne valley, where the French troops now numbered some 45,000 men. Here Napoleon got news of Blücher's force which, as we have seen, was on the march from Lorraine to join Schwartzberg. Napoleon immediately moved south, hoping to be able to head Blücher off and destroy him before he could effect a junction with the main army. Blücher had, however, already got on too far, and Napoleon was unable to do this. He pursued him vigorously, nevertheless, and followed him up as far as Brienne; south of which place, being now within supporting distance from the main army, Blücher turned round to face Napoleon. Of the other French corps, Macdonald on his way from the lower Rhine, was still some way off, north of Chalons, while Mortier falling back before Schwartzberg's advance had retreated to the Seine to hold the crossings over that river. Schwartzberg's main army had at this time reached the neighbourhood of Bar-sur-Aube. The two corps originally sent towards Strassburg had been meanwhile directed to leave behind sufficient men merely to mask the Rhine fortresses and rejoin headquarters with the remainder. At this time they were still on their way, east of the Marne. The reserve corps left behind east of the Rhine had also been called up and were now close behind the main army.

It will be remembered that after crossing the Rhine, Blücher had been obliged to leave behind two of his corps to mask the fortress in Lorraine. Reinforcements coming from the north enabled these corps to be released from this duty, and they were ordered to rejoin Blücher. On the date we are dealing with, they were on their way to do so.

Such then was the situation when Schwartzberg heard of Napoleon's arrival on the scene and of his onslaught on the Prussians. He immediately sent three of his most advanced corps to reinforce Blücher, who on their arrival had some 80,000 men with which to oppose Napoleon's 40,000. On the 1st February Blücher attacked the French and drove in their advanced troops from the little village of La Rothiere, south of Brienne. Napoleon having failed to prevent a junction of the allies, and finding himself outnumbered, now ordered a retreat to the line of the Seine. There was no pursuit to speak of, and, picking up Mortier *en route*, he marched to Nogent, where, holding the bridges over the south prong of the "fork," he lay in wait ready to take advantage of any opening the movements of the allies might give him. To Macdonald, who by this time had reached Chalons, he sent a message to move westwards along the Marne and so join him.

On the side of the allies, now, an extraordinary thing happened. Having successfully accomplished a junction of their forces what

should they do but immediately separate again and so give Napoleon that chance he was watching for. The reason for this separation is probably to be found in the character of the two commanders. Blücher, by nature hot-headed and impulsive, was probably impatient of the methods of the slow and cautious Schwartzenberg, who though nominally Commander-in-Chief of the allies does not appear to have had much authority over his Prussian confrère. Anyhow, separate they did, Blücher leaving the main army and marching north to unite with his corps on their way from Lorraine, intending thereafter to move towards Paris by the roads which ran inside the "fork." Schwartzenberg meanwhile, with the main army, was to advance on Paris by the roads lying to the south of the "fork."

This brings us to the situation shown on sketch No. 3. Blücher on separating from Schwartzenberg moved to Chalons, where he met his other corps coming from Lorraine. Here also he came in contact with Macdonald, who in obedience to Napoleon's message now began to retire along the Marne. Blücher at once sent one of his corps, that of Yorck, to pursue Macdonald along the Marne valley, while he despatched another corps, that of Sacken, by the direct Paris route, in hopes of cutting Macdonald off at Ferte-sous-Jouarre. He also sent a corps of Russians under Olsufieff to follow Sacken by the same route and keep up communication with him. Blücher wanted to collect all his reinforcements before advancing himself, and so remained behind with his remaining troops. By the 9th February, as a result of his anxiety to catch Macdonald, he had strung out his force as shown on sketch 3, oblivious, apparently, of Napoleon, who was lying in wait for just such a chance as this. On the evening of this date, the 9th, reports reached Blücher that the French had been seen at Sezanne. He immediately realised the mistake he had made and sought to remedy it by sending urgent messages to his scattered generals to retrace their steps and reunite with him. He was, however, too late. Napoleon was on to him.

Napoleon, as soon as he saw the opening which Blücher had given him, seized the opportunity with his characteristic energy and rapidity. Olsufieff's corps was selected as the first victim. Leaving two of his marshals, Victor and Oudinot, to observe and keep in check Schwartzenberg's army, he fell with his other corps on the solitary Olsufieff, and at Champaubert, on the 10th February, practically destroyed him. Then, detaching Marmont's corps to watch Blücher, Napoleon next advanced against Sacken, who in obedience to Blücher's message, was now retracing his steps. Napoleon met him on the 11th February at Montmirail, attacked him with a 3 to 1 superiority, and drove him with heavy losses on to Yorck, who by this time was coming up to his support. Yorck now tried to take up a position to cover the retreat of the remnants of Sacken's corps, with the result that he too was defeated, and the two together were driven in headlong flight across the Marne. Blücher himself now remained to be dealt with, so Napoleon, leaving Mortier's corps to

pursue what was left of Yorck and Sacken, turned back, by the road he had come, to tackle him.

As soon as Blücher heard of the disaster to Olsufieff's corps, he marched along the Paris road in hopes of being in time to assist his other generals, but was kept in check by Marmont till Napoleon could get back after disposing of Yorck and Sacken. At Vauchamps on the 14th February, Napoleon met Blücher, and attacking him with considerable superiority of numbers, defeated and drove him back to Chalons. Here Blücher, after a while, managed to collect the *debris* of his different corps. He had lost, as a result of these battles, some 20,000 men, or about one-third of his total strength.

Napoleon had now to turn his attention to Schwartzberg's army, so leaving the corps of Mortier and Marmont to look after what was left of Blücher, he marched the remainder towards the Seine where the situation had meanwhile assumed the aspect shown in sketch No. 4.

It will be remembered that when Napoleon proceeded against Blücher's scattered troops, he had left the corps of Victor and Oudinot to watch and delay Schwartzberg's army. They had but 20,000 men against 120,000, so could not do much to retard the allies' advance, which, however, was itself very slow. Schwartzberg did not get to Troyes till the 8th February, and his advanced corps did not reach the line of the Seine about Nogent till the 12th. On the 17th his troops were in the positions shown on sketch 4. Three corps, those of Wittgenstein, Wrede, and the Prince Royal of Wurtemberg had succeeded in forcing the passage of the Seine, and had advanced as far as the line Nangis-Montereaux. The rest of Schwartzberg's army was between Montereaux and Sens, except his reserve corps which were still behind Nogent. Oudinot and Victor, after making a desperate effort to hold the line of the Seine, had been obliged to retire and had taken up a position behind the Yères river, where they were joined by Macdonald, who, it will be remembered, had retired, pursued by Yorck, from Chalons along the Marne valley. Napoleon, after defeating Blücher at Vauchamps on the 14th February, had himself proceeded to the Yères, where, by the 17th, he had united all his corps except the two, those of Mortier and Marmont, left behind to watch Blücher.

It was now Schwartzberg's turn to pay the penalty for unduly dispersing his forces. Wittgenstein, whose position as will be seen, was in the air, was the first to suffer. He appears to have realised his danger, for he had actually started retreating towards Nogent, when Napoleon fell on him and almost destroyed his corps. Napoleon then, without wasting any time, immediately turned on Wrede and defeated him at Donnemarie. Having disposed of Wrede, he next attacked the Prince Royal at Montereaux and drove him, on the 18th February, across the Seine with a loss, of half his numbers.

Schwartzberg, cautious and hesitating at the best of times seems now to have lost his nerve. Notwithstanding that his own army, without counting that of Blücher, still outnumbered Napoleon's

by 2 to 1, he ordered a general retreat of all his troops to Troyes, where he informed Blücher he wished their forces once more to reunite.

By the 22nd February, the situation was as shown on sketch 5. Schwartzenberg had collected his troops at Troyes. Blücher, leaving a newly-arrived Russian corps to watch Mortier and Marmont, had reached Mery with the remainder. Napoleon was back in his old hiding-place at Nogent.

News from the south now came in which further disturbed Schwartzenberg's peace of mind. It will be remembered that when he first invaded France, Schwartzenberg had sent a corps under Bubna south through Switzerland towards Lyons, to guard his left flank, and we saw also that the French marshal Augereau was at the time in that neighbourhood busy raising fresh levies. These had now risen to some 20,000 men and Augereau with them had driven Bubna back into Switzerland. Schwartzenberg in a serious state of alarm for his south flank, now detached 40,000 men from his main army against Augereau.

This news about Bubna was the last straw for Schwartzenberg, who appears now to have given up all hope of being able to contend successfully with Napoleon. He decided on a general retreat of the allies towards the frontier and opened up negotiations with the French for an armistice.

The first phase of the campaign may now be said to be over. Napoleon with a force, largely raw levies, of hardly a quarter of their numbers, had put to flight the invaders and induced them to think of peace. Unfortunately for himself and his dynasty, however, Napoleon had become unduly elated as a result of these recent victories, and he declined to entertain any idea of peace till he had re-conquered all the territory he had lost in Germany the previous year, though he must have realised how inadequate his resources now were with which to do so.

The second phase of the campaign which now began is not so full of dramatic incident nor of military interest as the first, and will therefore be touched on more briefly.

Notwithstanding the disasters the allies had experienced as the result of dividing their forces, we find them at the end of February doing precisely the same thing again.

Blücher whose indomitable spirit was the saving of the allies in this campaign, had urged on Schwartzenberg the necessity for taking the offensive with the numerical superiority over Napoleon which they had. He had done so, however, in vain, and finding Schwartzenberg bent on his idea of a retreat, he decided to part company with him once more and attempt to do single-handed what Schwartzenberg hesitated to do united.

Schwartzenberg began his retirement east from Troyes on the 23rd February (*vide* sketch No. 6). On the 24th, Blücher marched north, intending to unite with four new corps of Russians and Prussians now *en route*, and then, hoping to have a force of

some 120,000 men, to march on Paris. Blücher, it will be remembered, was at Mery, and his first anxiety was to get across the Aube and the Marne before Napoleon could intercept him; he hoped then by holding the line of the Marne in his rear, to effect a junction in safety with his reinforcements. As Napoleon had left Nogent and followed Schwartzenberg as far as Troyes, he was too far off to interfere with Blücher who thus got the start he wanted. Driving before him Mortier and Marmont, Blücher succeeded in crossing the Marne at Ferte-sous-Journe on the 27th February. Mortier and Marmont retired to Meaux.

Napoleon, as soon as he saw what was happening, detached Macdonald and Oudinot to follow up Schwartzenberg's retirement, while he himself with the remainder started off on the heels of Blücher, reaching the Marne on the 2nd March, three days after him.

Blücher's intention had been to cross the river Ourcq, and so gain the high road which ran between Meaux and Soissons, but he had been frustrated in this by Mortier and Marmont, who defeated the head of his columns as they were trying to cross the river and then destroyed the bridges. Blücher had now to make his way north as best he could in the roadless and marshy country east of the Ourcq. With Mortier and Marmont on his flank and Napoleon coming up behind him, his task was no light one. Fate, however, stepped in to assist him. The town of Soissons, though fortified by the French, had on the 2nd March surrendered without a struggle to the newly-arrived corps of Witzingerode and Bülow. These generals were, therefore, able to stretch out a helping hand to Blücher, who effected his junction with them in safety on the 3rd March.

Blücher had now (*vide* sketch 7) accomplished part of his programme, a junction with Bülow and Witzingerode. Two more corps, those of Saint Priest and Jagow were still on their way, and Blücher wanted to let these join him before making any offensive movement. Napoleon's object was to prevent such a junction and to drive Blücher, if possible, to the north, still further away from his reinforcements and from Schwartzenberg. He accordingly moved in a north-east direction and crossed the Aisne river. Blücher sent two of his corps to delay Napoleon's march and take him in flank, while he marched the remainder to the town of Laon. On the 7th March, at Craonne, Napoleon defeated the two corps sent to delay him, and then advanced on Laon, where he found the Prussian general had taken up a strong position outside the town. Napoleon attacked Blücher's position on the 9th and again on the 10th, but failed to make any impression on it and lost heavily in these attacks.

Napoleon now received disquieting news from his marshals, Macdonald and Oudinot, whom he had left behind to follow Schwartzenberg's retreat. The latter as soon as he found that Napoleon had gone after Blücher, and that there were only two French corps following him, stopped his retreat, turned, and advanced against them to the line of the Seine.

When he heard of this, Napoleon decided to leave Blücher alone for the present, and return to deal with the more pressing danger from Schwartzberg. He left the corps of Mortier and Marmont, as before, to watch Blücher, and started south with the remainder on the 11th March. No attempt was made to pursue him, and he arrived on the Aube river on the 18th, having met and defeated at Rheims the newly-arrived Prussian corps of Saint Priest. By this date Macdonald and Oudinot, pursued by Wrede and Wittgenstein, had retired north of the Seine. Schwartzberg, getting news of Napoleon's return, now ordered a concentration of his troops, and by the date we are dealing with they were collected between the Seine and the Aube. (*Vide* sketch 8.)

Napoleon had evidently hoped, by the rapidity of his march, to catch Schwartzberg's corps isolated, as he had done on a previous occasion, for he at once crossed the Aube and attacked without delay the nearest body of the allies at Arcis-sur-Aube. But, as we have seen, this time the allies had concentrated their forces, so Napoleon found in front of him not an isolated corps, but a solid mass of some 80,000 men. He broke off the fight and retired to the north of the Aube, where he was joined by Macdonald and Oudinot.

Napoleon's plight was now well nigh desperate. His own forces were getting exhausted from the continual marching and fighting of the last three months. They were dwindling in numbers, and the country was getting depleted of able-bodied men from which to replenish their ranks. There was nothing to be done against Blücher, who, constantly receiving fresh reinforcements, now far outnumbered him. Schwartzberg had also been reinforced, and against his troops, concentrated as they now were, an attack was out of the question.

Under these circumstances, to an ordinary man the only thing left to do would have been a retirement towards Paris, to collect there every available man, and then make one final bid for victory, or, at all events, for more favourable terms, under the walls of the capital.

Not so, however, thought Napoleon, who adopted a course far more in keeping with his whole nature and his past career. Like a gambler risking his last chance, he staked everything on one bold attempt to work on the fears of the timid Schwartzberg. Leaving Paris to take care of itself, he marched east to Vitry, intending from there to get in Schwartzberg's rear and cut his communications with Germany. Had he now had to deal with Schwartzberg alone, this manoeuvre would very likely have been successful, and the allies might have been seen once more in full flight towards the frontier. But meanwhile, in the allied army, the reins had been taken by the Emperor Alexander of Russia, a man of a very different stamp to Schwartzberg, and one who was not to be bluffed by a move of this sort.

On Alexander's initiative, it was decided to ignore Napoleon's movement, watching him merely with a body of cavalry, to call down

Blücher to rejoin the main army, and then to march united on Paris. This was done. On the 30th March, Joseph Bonaparte's force defending Paris was defeated, and on the 31st the allies entered the French Capital. As soon as Napoleon saw that his manœuvre had failed in its desired effect, he made a desperate effort to reach Paris before the allies marching south of the Seine, but he had only reached Villeneuve when the capture of the Capital by the allies decided the fate of himself and of his dynasty.

Such then was the course of this campaign, which, with the exception of the brief but eventful 100 days in 1815, was the closing one of Napoleon's career. Notwithstanding its final ending, it is looked back to by the French army with the greatest pride, and justly so, as an example of what can be done by the French soldier under the most adverse circumstances.

It now remains for us to examine some of the causes which led to the results achieved by these French soldiers on this occasion, and see how far they were due to accidental circumstances and how far to methods capable of being imitated in the future.

The first thing that cannot fail to strike one at once about the whole campaign is the spirit in which Napoleon set to work and the view he took of the best way to fulfil the object he had in view. The allies had invaded France with greatly superior numbers. Napoleon's task was to hold them in check, and keep them off the Capital while fresh levies were being raised throughout the country. Afterwards he hoped with these levies to be able to assume the offensive, but at first his rôle was a purely defensive one, and his object to stop, or, at all events delay, the advance of the enemy.

Now what would be the ordinary way of setting to work to do this? Why, by selecting a series of the strongest positions to be found in the country, giving battle at each in succession, and retiring from each one before the enemy's superiority had had time to compromise one's retreat. By playing in fact what is laid down as the orthodox rôle for a rear-guard.

Now compare this with the manner in which Napoleon carried out this selfsame defensive rôle. Wait behind positions for the enemy to attack him—not a sign of such a thing. Though he was on the defensive, it was he, and not the enemy, that did the attacking. He could not attack them directly, however, as they were four times as strong as he was. His method was, therefore, while keeping out of their reach, to watch incessantly for some weak spot to appear in their armour where his little force could successfully get a thrust home. And when that weak spot appeared he lost not a moment, but struck out with lightning-like rapidity. Such rapidity of decision and movement is, in fact, the essence of defensive tactics of this nature. A foe superior in numbers will not look on calmly while part of his force is being crushed. The crushing, if it is to be done at all, must be done with such rapidity that he is powerless to prevent it.

In the example which we have in this campaign of Napoleon's defensive method, large bodies, (several army corps), are of course being

dealt with, but the lesson conveyed is one that is really applicable to a force of any size acting in the presence of a superior enemy. Put briefly, it simply amounts to this. The best way to keep off a man who wants to hit you is to hit him in the eye yourself. All very well, it may be said, but if he is four times as big, how is the thing to be done? As Napoleon did in this case, by putting superior mobility against his great size. Keep out of his reach till he gives you an opening and when that opening comes, which in warfare sooner or later it will, then let drive for all you are worth. One or two such thrusts will make him cautious in his dealings with you, one or two more, and he will most probably clear off as we saw the allies did at the end of the first phase of this campaign.

But, it may now be asked, were not the conditions in this campaign exceptional? One surely cannot always reckon on having opponents who will give the chances that Blücher and Schwartzberg gave to Napoleon? No, possibly not, but military history shows us that chances will always come, all the same. There is a well-known saying of Napoleon, "Fortune never denies opportunity to a man who is prepared to profit by it," and the history of almost any successful soldier will bear this out. Take Stonewall Jackson's career, for example, or even Napoleon's earlier and greater campaigns. What are they but a record of mistakes of opponents promptly seized and turned to advantage? On the other hand, in the case of the unsuccessful ones, is not theirs generally a record of opportunities let slip by, and not turned to account? We see, therefore, that so far from the fact of one side having made many mistakes in a campaign detracting from the value of that campaign as a lesson for the future, if anything it rather enhances it, for one of the chief things to be learnt from military history is how to recognise an opportunity when it comes, and having recognised it, how to profit by it.

This brings us to the next point, one which bears directly on what an "opportunity" in a defensive war, such as this one, really consists of. Note Napoleon's eagerness for a fight whenever he had, or thought he had, a local superiority of numbers, and again his eagerness to clear off without fighting whenever he found the superiority was on the other side. When he first joined his marshals at Vitry, and found Blücher on the march with 20,000 men, how he immediately starts after them with his 40,000. Blücher gets help from Schwartzberg and turns round with 80,000 to meet him. Napoleon at once clears off. Next Olsufieff's 10,000 appear alone, and within reach of his 40,000,—— Napoleon loses not a moment but is on to him at once. And so on, throughout the campaign. If there is one principle, more than another, which seems to have actuated Napoleon, not only in this campaign but throughout his whole career, it is the one that is embodied in the proverb "Providence always favours the big battalions." Once it comes to the actual rough-and-tumble of a fight, the one and only factor that can *guarantee* success, is a numerical superiority on the actual spot where the fighting takes place. Other factors have their influence and contribute to the

result, but there is nothing that will propitiate Providence, as the proverb has it, like the "big battalions." We see, consequently, the opportunity Napoleon sought, the weak spot in the enemy's armour he so assiduously watched for, was a portion or portions of their troops in such a position that before they could get help, he could fall on them in superior strength.

History shows us that though one combatant may have been the weaker throughout the theatre of war (as Napoleon was in this case) or even perhaps in the neighbourhood of the battlefield, yet if that combatant has been successful, it is almost invariably, unless he is dealing with alarmed savages, because he has managed to collect on the actual spot where the fighting took place more men than his opponent. This is a fact which is very liable to be obscured, for it is only human nature to try and ascribe a victory to the innate superiority of one's nation over the foreigner, with the result that often only half the truth is given out regarding the numbers employed by both sides on the occasion.

Napoleon was fond of distorting facts regarding numbers in this way, but he did so deliberately, in the hope of improving the *moral* of his troops thereby. Loudly would he proclaim to his army that the results of the last battle had proved incontestably the superiority of one Frenchman over three foreigners, knowing full well, all the time, that at that selfsame battle he had taken every precaution to ensure that there would be three Frenchmen present for every one foreigner. And to the skill with which he was generally able to ensure this may, in the main, be ascribed his long series of triumphs.

Yet one more point. We saw how Napoleon's last act in this campaign was a manœuvre of extraordinary audacity, an attempt to cut the communications of the allies with a force which was, compared to theirs, absolutely insignificant. We saw also how this manœuvre was aimed directly at, and derived its only hope of success from, the known cautious and timid character of the allied commander. In this we find a conspicuous example of a feature of Napoleon's generalship which is to be met with in all his campaigns, and to which he owed, in no small measure, his extraordinary success. This feature was his habit, when thinking out his plan of action, of placing in the forefront of the considerations to guide him, the characteristics of the troops he was opposed to, and the personal character of their commander. Was that commander a rash and headstrong man, then he would leave him alone for a bit, let him "have his head," as he would then probably do something foolish which would give him an opportunity for an effective counterstroke. Was he, on the other hand, slow and cautious, he would try and bluff him,—it would generally come off. In fact, and this is the lesson Napoleon's action in this respect teaches us, war is not like a game of chess in which the opponent's pieces are of a fixed value and whose moves can, therefore, only be met by similar countermoves on our part. The opponent's pieces are, on the other hand, composed

of living men with varying feelings and characters, and the first thing to ask oneself before making a move is whether there is not something in these feelings and characters which we can profit by. There was an incident in the Peninsular War which furnishes a very remarkable example of Napoleon's action in this respect. It occurred in 1808, when Napoleon took the field in person to repair the disasters which had befallen his brother Joseph out there. He, of course, drove the Spaniards before him and recaptured Madrid. The incident referred to occurred when the French army reached the foot of the Sierra de Guadarrama, that mountain range which covers Madrid on the north, and on which the Spaniards were expected to make their final stand in defence of their capital. The Spaniards were there all right, and in a strongly fortified position holding the pass, so to all appearances it was a difficult task that lay before the French army. How did Napoleon act? He simply sent a couple of squadrons of Polish lancers to canter up the road leading to the pass. The Spaniards turned and fled, and left the road open to Madrid for the French army. There was no battle, so historians of the war generally dismiss the incident with a few words of sarcastic admiration for Spanish pluck. But it deserves a great deal more than such a mere passing mention, for there is probably no incident in Napoleon's career which gives us a greater insight into the workings of his mind and into his methods. How did Napoleon "appreciate the situation," as we should say nowadays, when he was met by those frowning defences on the Sierra de Guadarrama? By trying to place himself in the shoes of those men who outwardly looked so formidable behind their defences; by trying to look at things from their point of view and then seeing whether there was not something in that point of view which could be turned to his advantage. He then argued to himself probably somewhat as follows: "These men have just suffered a series of defeats at my hands, — they have been running before me like hares for the last 10 days, and the probability is that at the present moment they have absolutely lost their nerve and only want a fillip to set them going. We will try the effect of a little Polish cavalry on them. If it does not come off, two squadrons are not, after all, an irreparable loss, while if it does, we have the road open to Madrid without firing a shot. It is worth trying." It certainly was. To go back to our simile, the characters and feelings of the opponent's pieces on the chessboard, on this occasion, were such that the game could be won in one simple move, but it was a move which would never have occurred to a man who did not take those feelings and characters into consideration.

It will not be possible within the limits of this lecture to go further into the lessons to be derived from this remarkable campaign, about which much more might be said especially regarding the action of the allies, which has here not been touched on at all. To those interested in the campaign Clausewitz's work on the subject will amply repay study, being a remarkable example of deep insight and clear thinking.

One word more in conclusion. We have seen how it was on superior mobility that Napoleon relied to get the better of his more numerous foes in this campaign. Now, however much superior mobility may be wished for by a commander, it can be supplied only by exertions and endurance on the part of his troops, and in the very brief resumé of the events of the campaign given in this paper, a point which has probably not been brought sufficiently to notice is the manner in which Napoleon's troops responded to his call for such mobility, and the extraordinary exertions which they cheerfully underwent to further the plans of their leader. Consider it for a moment. When Napoleon defeated Blücher's force at Vauchamps on the 14th February, his troops had already been marching hard for seven days, during the last three of which there had been almost incessant fighting. Without a moment's rest they marched to the Yères river, reaching it on the 16th,—55 miles in two days. Again, without a rest, they start off to attack Wittgenstein; and before the next 48 hours are over they have defeated in turn three separate bodies of the allies, and incidentally marched another 25 miles while doing so. When we try to realise what all this must have meant to the rank and file, it will be difficult to withhold a tribute of admiration for those soldiers of Napoleon's army, or not to sympathise with French soldiers of to-day when they look back on those eventful days of February 1814 as not the least brilliant among the many glorious pages in the history of their army.

BRITISH RELATIONS WITH PERSIA AND WITH RUSSIA IN THAT COUNTRY, AND THE POSSIBILITIES OF RAILWAY DEVELOPMENT ON PERSIAN SOIL.

BY CAPTAIN J. H. F. LAKIN, 92ND PUNJABIS.

**A Lecture delivered at the Staff College, Quetta,
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We find the first trace of relations between England and Persia towards the close of the 13th century.

About 1285, the Shah Arghun or Argawan opened diplomatic intercourse with most of the sovereigns of Europe, including Edward I. of England.

During the half century which succeeded the discovery of the Cape route by Vasco di Gama in 1498, the Portuguese, then at the zenith of their naval supremacy, gradually established dominion over all eastern seas from the Cape to Japan. Their traders were not slow to open commercial relations with the various eastern countries, and their successes in this direction excited the jealousy of our merchants, who, finding the sea routes dominated by Portugal, turned their attention to the possibilities of reaching Persia by land.

In 1555, the British Muscovy Company received a charter from Philip, and Mary, Queen of England. The object of this company was to open a trade route *vid* Moscow, Astrachan, and the Caspian, which would enable it to tap the trade of Bokhara and Northern Persia.

Between 1561 and 1581, six trading expeditions were despatched by the company. The first of these, under the leadership of one Jenkinson, who was the bearer of a letter from Queen Elizabeth, reached the court of Shah Tahmasp, at Kasvin, in August 1562. Repulsed by this king, the expedition met with small success, nor were those which succeeded it productive of great results.

In a letter from the leader of the third expedition, who had succeeded in obtaining a charter from Shah Tahmasp, we read that "The Russes are sorie that we do trade into these parts—for wee are better beloved that they are."

On the death of Shah Tahmasp, the invasion of Persia by the Turks put a check on English trade enterprise in these parts.

In 1581, the Turkey and Levant Company was formed with the object of exporting Persian silk by the Basrah, Baghdad and Aleppo route, from which we see that, even in those days, the value of the line to be followed by the proposed Baghdad Railway was recognised.

The defeat of the Spanish Armada in 1588 opened eastern seas to our trading vessels.

In 1600, Sir Anthony Sherley, an English soldier of fortune, journeyed to the court of Shah Abbas with the object of persuading him to make war on the Turks and also to re-establish commercial relations with England. Well received by the Shah, Sherley obtained from him a firman granting the right to "traffique" within Persian dominions to all Christian merchants, but this concession does not seem to have been immediately taken advantage of by our traders.

In the same year, 1600, the East India Company received its charter from Queen Elizabeth; by 1616 its directors had awakened to the possibility of trade with the Persian Gulf, and a ship, commanded by one Captain Childe, was despatched from Surat to Jashk 'to get a kind of possession' there. In the course of the next three years a factory was established at that port.

In 1618, the East India and British Muscovy Companies decided to amalgamate their forces and attempt the re-establishment of the overland route through Russia. Overtures to the Czar failed, and later on, in 1660, English traders were expelled from all parts of Russia, except Archangel.

In 1622, the East India Company established a factory at Ormuz, the Portuguese being ejected.

The early years of the 18th century found a Czar on the throne of Russia, who was in sympathy with England, *viz.*, Peter the Great. In 1725, the year of his death, he attempted to revive the trans-Russian trade between England and Persia. In 1734, his successor Anne once more granted a concession to British subjects to use the overland route, in return for a duty of 3 per cent *ad valorem*.

In 1739, an Englishman named Elton obtained a decree from Nadir Shah's regent, authorising him to trade everywhere in the Persian dominions from the Caspian to Attock on the Indus.

After the murder of Nadir Shah in 1747, the remaining factors of the British Muscovy Company, being plundered of £80,000, finally abandoned their enterprise, and the Caspian route was closed once and for all to British traders.

In the Persian Gulf, East India Company's factories had carried on their trade with varying fortune during the century which followed their establishment. The anarchy which followed the death of Nadir Shah led to the factories being closed, but in 1763 Bushire was selected as the headquarters of the Gulf trade, and in 1770 a depôt was opened at Basrah.

From 1780 to 1790, trade was carried on at a loss, but from that time onwards the trade between the Gulf and India rapidly increased in value.

The year 1800 marks our realisation of the importance of Persia as a factor in the defence of our Indian possessions. At that time, Shah Zaman, the ruler of Afghanistan, was thought to be contemplating a descent on India; he had already on two occasions penetrated as far as Lahore. Consequently, a mission under Captain Malcolm was despatched from India to the court of Tehran with the object of inducing the Persian king Fattah Ali Khan to send an

army against Herat, thereby applying a blister to Afghan aspiration.

Fatteh Ali Shah had, before Malcolm reached his court, embarked on this campaign of his own initiative.

The Malcolm mission had also other purposes—at this period the spectre of French invasion of India was ever before the eyes of our rulers. It was supposed that France, having established herself in the Persian Gulf, would use her footing there as a base from which to launch her invading forces.

Malcolm, mainly by a somewhat reckless prodigality in expenditure, succeeded in concluding a treaty with the Shah, by which the latter bound himself to do all that was possible to exclude the French from his kingdoms and to facilitate commercial relations between his subjects and ours.

The mission had one effect that has, and must always, prejudice our relations with Persia—it opened the eyes of the Persian to the fact that they were the possessors of one road by which our Indian territories could be approached. This realisation on their part has provided them with an asset of which they have made much use in our subsequent dealings with them.

The first quarter of the last century saw the gradual consolidation of Russian influence in Northern Persia.

Defeated at the battle of Erivan in 1804, Persia gradually lost her hold upon Mingrelia and her other provinces bordering the Caspian, which passed into Russian hands. Our lack of support at this juncture led to a resumption of Persian relations with France. The treaty of Tilsit revived our apprehension of a French descent upon India, this time with the co-operation of the Russian and Persian forces. Accordingly in 1808, the Home Government deputed Sir Harford Jones to proceed to Persia and enter upon an alliance with the Shah. It is a curious sidelight on the relation of the Home to the Indian Government of that time, that we find that the Viceroy, Lord Minto, *also* sent a mission under the leadership of General Malcolm. What is described as an unseemly struggle then ensued between the two sets of authorities.

Malcolm arrived on the field first, but his mission proved abortive owing to the strong influence exerted by the French representative at Tehran. Sir Harford Jones was eventually successful.

In 1809 a treaty was formulated by which England and *not* France was recognised as the protector of Persia against Russian aggression; on the other side, Persia was to act as a check to Afghan pretensions on India. It was arranged that India should supply officers to remodel the Persian army, and these succeeded in doing much good in this way.

The year 1811 found Persia still at war with Russia, and the reconciliation between England and Russia in 1812 led to the withdrawal of our active support in Persia.

In 1813, peace between Russia and Persia was concluded by the treaty of Gulistan, by which all Russian acquisitions south of

the Caucasus were confirmed to her, and the Caspian Sea became a *mare clausum* to all but Russian ships.

In 1814 we concluded another treaty with Persia which is known as the treaty of Tehran. Its chief stipulations were that Persia should do all in her power to hinder Russian expansion in Central Asia, and that in return she should receive an annual subsidy amounting to about £100,000. The underlying principle of this treaty was that any act of Russian aggression upon Persia should be considered as a demonstration against India.

During the next thirteen years, we continued the improvement of Persia's military resources and attempted to establish our influence at the court of Tehran.

Our success in this direction led to various attempts on the part of Russia to undermine our position. A Russian mission was despatched to Tehran in 1826, but, diplomatic means proving a failure, resort was had to aggression.

Russia occupied the Gokcha region, which, though uninhabited, undoubtedly formed part of Persian territory. Under the terms of the treaty of Tehran, Persia called on us for our support in the war which followed, but greatly to our discredit, we refused to intervene.

The war lasted until 1828, and resulted in the defeat of Persia; it was concluded by the treaty of Turcomanchai, by which Persia was bound to the payment of an indemnity of three and a half millions, the district of Khoi being given in pledge for part of the payment. Russia also gained Erivan and Nakhichevan, and, by this treaty, commenced the establishment of commercial supremacy in northern Persia.

In 1834, notes were exchanged between the Russian and English Governments which expressed their mutual desire to maintain the integrity of Persia. In the same year, we again sent a number of officers and men to assist in training the Shah's forces.

In 1836, Russian intrigue at the Persian court led to the dismissal of these, and in the same year, again undoubtedly at Russian instigation, the Shah undertook the siege of Herat, a fortress greatly coveted by the Persians as having originally formed part of their dominions. This necessitated instant intervention on our part, as it was considered that the fall of Herat would lead to the establishment of Russian influence at Kandahar and Kabul and to the destruction of the last barrier which prevented aggression towards Northern India.

The army of the Indus was assembled, the island of Kharak, 30 miles north-west of Bushire was occupied, and strong representations were made by Mr. MacNeill, our Minister. That Herat did not fall was chiefly due to the skill of Lieutenant Pottinger, an Engineer officer whom we had lent to Afghanistan. The siege was abandoned and the Persian forces withdrew.

The result of this intervention was that, to some extent, we compromised ourselves with Persia, and during the next four years it required all the talents of Sir John MacNeill to restore equilibrium.

In 1842, this officer reported to the Foreign Office that the Russians were in occupation of the island of Ashurada, on which they had first set foot in 1838. Their position there was gradually strengthened, despite protests by the Persians and ourselves, and a naval arsenal was established on the plea that it was necessary for the refitting of ships maintained to deal with Turkoman piracy.

In 1848, the Shah, Mahomed Shah, died, and was succeeded by Nasir-ed-Din.

During the next five years, considerable pressure was exerted both by Russia and ourselves with the object of advancing the progress of the country.

In 1853, we entered on a convention with Persia by which she bound herself to respect the integrity of Herat. In the same year, attempts were made by Russia to induce Persia to associate herself in the war against Turkey which Russia saw would be a necessary prelude to her further expansion southwards. Fortunately for Persia the negotiations were broken off, otherwise, as events turned out, she would have found herself opposed to England.

Despite the convention of 1853, Persia continued to take an active, if covert, interest in the affairs of Herat.

In 1855, the Heratis, tired of the misrule of their Prince, Saiad Mahomed, deposed him, and placed on the throne Mahomed Yussuf, a Saddozai, who for some years had been a refugee in Persian territory. In December of the same year, our minister at Tehran, owing to the continuance of a policy of provocation by the Shah, withdrew to Baghdad, and, in the following March, a Persian army was despatched to Herat. Admitted to that city by Mahomed Yussuf, it remained there as evidence of the dependency of Herat on Persia.

A period of revolution now set in, with the final result that Herat was definitely ceded to Persia.

This violation of the convention of 1853 led to war with us; Kharak Island was once more re-occupied, and troops were landed at Muhammareh at the mouth of the Karun, where some fighting took place, and also at Bushire (Borazjun). The campaign was a very short one, and peace was signed at Paris in March 1857.

The Persians evacuated Herat and agreed to abstain from all further intervention in the affairs of that province; Great Britain agreed to evacuate all Persian territory, and the establishment of consular representatives was agreed upon. It was a matter of much comment at the time that we did not insist on the cession of Qishm Island or some point on the Gulf as a set-off against the Russian occupation of Ashurada.

The next seven years were distinguished by a policy of non-interference in Persian affairs on our part.

The question of the ownership of Sistan which had for some time been a fruitful source of contention between the Persian and the Afghans, was rapidly approaching a critical stage. Repeated efforts were made by Persia to induce us to prevent Afghan aggression in that neighbourhood, but we held aloof.

In the year 1863, a telegraphic convention was entered upon with the Shah, whereby permission was obtained for the construction of a telegraph line which would link India with the European system. The line selected ran from the Perso-Turkish frontier, east of Baghdad, through Kirmanshah, Hamadan (with a branch to Tehran), and thence by Isfahan and Shiraz to the Gulf at Bushire, where it joined the marine cable to Karachi.

The laying of this line produced a most effective bond between ourselves and our Persian neighbours; the officers engaged on its construction proved to be most capable mediators, when called upon to arbitrate between the Shah and some of the more refractory of his distant subjects. This led to a considerably improved relation between the two Governments, and, in 1870, we at length consented to act as arbitrators between Persia and Afghanistan in their dispute over the Sistan boundary.

A commission was accordingly appointed under the leadership of General Goldsmid, and the work, which was carried out under circumstances of peculiar difficulty, was concluded in the autumn of 1872.

The decision, which was based on a most detailed examination of the various interests, proved satisfactory to neither party.

The line followed is practically that which forms the present boundary. The Persians who had been at some pains to establish themselves on the east of the Helmand, and had built posts at Kala-i-Fath and other places, found themselves confined to the western bank. On the other hand, the arbitrary line drawn from about Band-i-Sistan on the Helmand to Kuh-i-Malik Siah confirmed the hold of Persia over the highly productive plain of Sistan proper. Both sides eventually accepted the decision, though with reluctance; the impression produced on the mind of Sher Ali, the Afghan ruler, was not without its results during the period which preceded the Afghan War of 1878.

During the five years 1868—1873, Russia had been gradually strengthening her hold on the eastern shores of the Caspian. In 1869, Krasnovodsk was seized and a fort constructed there. Krasnovodsk had several recommendations in Russian eyes; it possessed a good harbour, and formed a convenient base for operations either against the Turcomans or the Persians themselves. Persia protested against this encroachment, and received the reply that Persian territory ended with the river Atrak.

By 1873 the Russians had obtained control over the Caspian littoral as far as Chikishliar, and in order to quiet the outcry raised by us on account of her continual absorption of Persian territory turned their attention to the subjugation of Khiva.

Kizil Arvat was occupied in October 1872, and Khiva was entered on 10th June 1873. During the next few years, the Russians steadily prepared for a further descent on the Persian and Afghan borders. The military district of Trans-Caspia was formed and organized.

By the Akal-Khorasan Boundary Convention of 1881, the River Atrak was fixed as the boundary. At this time Astarabad, Meshed, and Sarakhs were practically under Russian control, and the latter place was actually seized in 1884, in which year Merv also was added to the Russian dominions.

In May 1884, Persia entered on a convention with Russia by which the latter gained possession of Panjdeh on the Murghab and Pul-i-Khatun on the Hari Rud.

As the occupation of Pul-i-Khatun was undoubtedly a violation of Afghan territory, the Amir entered a strong protest, in which he was supported by us. The Russians continued their advance towards the Kushk River and on 30th March 1885 defeated the Afghans at Ak Tapa.

A boundary commission, presided over by Sir Peter Lumsden, had meanwhile been appointed to settle the Russo-Perso-Afghan frontier in this neighbourhood.

The Russians proved very obstructive and occupied the Zulfikar Pass, only 90 miles from Herat. Eventually between November 1885 and July 1886, the frontier between Zulfikar and Khwaja Salar on the Oxus was demarcated.

In 1886, Russia, disregarding the terms of the treaty of Berlin, fortified Batum on the Black Sea.

In 1888, the Central Asian Railway, which had been commenced at Krasnovodsk in 1881, was opened as far as Samarkand. For nearly 300 miles, the line follows the Russo-Persian frontier closely.

In 1889, a Russian Consul-General was appointed at Meshed, and what has been described as the russification of Khorasan commenced. A customs tariff was promulgated in 1895 which was intended to kill British trade in N. E. Persia. Various missions, scientific and otherwise, were despatched to Sistan, and eventually a Vice-Consulate was established at Nasratabad.

In 1899, great pains were taken to impress the Chief of Kain with the power and generosity of the Russian Government.

In the previous year Persia had been induced to see the advantage of replacing the old system, by which the collection of customs was farmed out to the highest bidder, by an organized arrangement on a European model. The services of a Belgian personnel under the orders of a M. Naus, were obtained, and a regular customs service was instituted. On the first year's working, an increase of 60 per cent of revenue was realised.

In 1900 Persia obtained a loan from Russia, which was guaranteed by the revenue from customs, and in 1902 a further loan was negotiated on the understanding that the Persian tariff should be revised in accordance with the wishes of Russia. Accordingly a new commercial convention was concluded and came into force in 1903. The negotiations preceding this convention had been kept secret and its publication brought home to us the danger to which our trade with Persia was subjected owing to the preferential treatment accorded to Russia.

A convention between ourselves and Persia was hastily concluded and signed at Tehran only four days before the new Russo-Persian tariff came into force.

By our convention we managed to maintain an equality of treatment with that accorded to Russia in the matter of import duties. But the tariff imposed on those classes of merchandise which are imported from Russia are light, whereas the commodities which form the bulk of our export trade to Persia are subject to heavy import duties.

A recurrence of the old dispute between Afghanistan and Persia as to their boundary in Sistan afforded the opportunity for the despatch of a mission to that neighbourhood in 1903, under the leadership of Sir Henry McMahon.

The mission had the useful effect of showing that we intended to maintain our treaty obligations by which we had undertaken to be arbiters in the event of such disputes arising. Moreover, an opportunity was afforded of demonstrating that we had relinquished none of our interests in that portion of Persia which separates the dominions of Russia from the Persian Gulf.

Had Great Britain remained passive at this juncture, her inaction must have been construed at both Tehran and Kabul as a confession of weakness. As it was, much valuable work was accomplished by the mission. The newly-established route from Quetta to Sistan was developed, and the foundations were laid for the clear understanding with Russia which found expression in the Anglo-Russian Convention of 1907.

It will here be convenient to summarise the principal features of that agreement, which has formed such a useful basis on which to conduct our relations with Russia during the present internal disorders in Persia.

By the Anglo-Russian Convention, August 1907, the Russian and British Governments mutually engaged themselves to respect the integrity and independence of Persia, to unite in preserving order in the country, and in establishing equal opportunities for commerce and industry for all other nations.

Great Britain undertook not to seek for herself or in the interests of any third power, any political or commercial concessions, such as railways, banking, roads, telegraphs, transport or insurance, to the north of a line running through Qasr-i-Shirin, Isfahan, Yazd, Kakhk, to Zulfikar, these places being included. Russia gave a similar agreement for a region south of a line, Gazik, Birjand Kirman, Bandar Abbas. The lines are shown on the map.

Existing concessions in the regions designated are maintained, and no opposition is to be offered to the seeking of concessions by the subjects of either country in the neutral zone between the lines mentioned.

The revenues of all Persian customs, excepting those of Fars and the Persian Gulf, are to be maintained as guarantees for loans concluded with the Russian Banque D'Escompte et des Prêts, the

revenues of the Persian Gulf and Fars constituting similar guarantees for loans concluded by the Imperial Bank, which was established in 1889 by British capital.

In the event of irregularities in the payment of interest on, or in the redemption of, such loans, Great Britain and Russia shall, in their respective regions, institute such measures of control as may guarantee the regular service of the loans. Such measures of control shall be determined in accordance with mutual agreement, resulting from a friendly interchange of ideas.

As is well known, the other articles of the convention deal with the relations of the two powers with Afghanistan and Tibet. Russia recognises that Afghanistan is outside the sphere of Russian influence, and Great Britain agrees that she has no intention of changing the political status of the country, and will only exercise her influence in order to preserve peace. Russian political relations with the Amir will be conducted through the medium of the British Government. Both powers agree to a policy of non-interference with regard to Tibet and recognise the suzerainty of China over that country.

Having outlined the convention which forms the basis of action of Russia and ourselves in Persia, it is now proposed to sketch the events which have led up to the unhappy condition of internal disorder in which the country finds herself at the present time.

1905 saw the commencement of the Nationalist movement in Persia, the steady growth of which is fraught with such tremendous issues for the future of the country. For some time there had been a party in the country which had noted with aversion the ever-increasing hold of Russia over the country. They saw that Russia's opportunity lay in the weakness of the country, crippled as it was by the extravagance of the Court and by the incompetence of the administration.

The events of 1904-05 in the Far East were watched with keen interest by the Persians as well as by all eastern peoples, and the discomfiture of Russia awakened the reform party in Persia to the opportunity for advancing their cause.

In response to popular demand, the Shah reluctantly granted a constitution in August 1906. A Mejliss, or National Council, was elected, which consisted of 156 representatives of all classes except peasants and labourers. The Shah as constitutional head of the country was advised by a cabinet of eight ministers, and there was to be a senate of sixty members, thirty of whom were appointed by the Shah.

The Mejliss in its early days effected many much-needed reforms. It placed a limit on the personal expenditure of the sovereign and his court, by allocating a definite sum to the Shah's civil list. It prevented the raising of a fresh foreign loan, which it foresaw would only be dissipated, as had been the two preceding ones, by the extravagance of the court, and which, moreover, could but increase the strength of the grip which Russia held on the country.

Measures were passed which secured to a considerable degree freedom of religious thought and equality of treatment for the various races, regulating the conduct of provincial governors, and establishing the system of local government by *anjumans* on a firmer footing.

As the effect of the various measures initiated by the *Mejliss* was to curb the power as well as the extravagant tendencies of the Shah, it is small wonder that he viewed its deliberations with increasing resentment.

In August 1907, the Premier was assassinated at the instigation of the reactionary party, but a swing of the pendulum compelled the Shah to sign a new constitution in October 1907, granting liberty of conscience, person, education, association, and press, and curtailing the prerogatives of himself and the priesthood.

By February 1908, a lack of discipline among the reformers themselves led to violent scenes in the *Mejliss*. In April its President resigned, and in May troubles broke out in the province of Azarbaijan, which has since remained the battlefield of the conflicting elements of the nation.

In June the Shah carried out his *coup d'état* by surrounding the Parliament House with his Cossacks, looting Tehran, and hanging some of the prominent leaders of the reform party.

At the beginning of September 1908, the Shah solemnly abolished the Constitution; this led to the presentation, on September 8th, of an Identical Note by Great Britain and Russia in which the Shah was urged to fulfil his promises to his people and to reinstitute the Constitution. His answer was that he was unable to do so as long as the province of Azarbaijan remained in a state of revolution. Since that time civil war has been waged with varying success. By May 1909, the situation had become so serious that the Shah saw the necessity of signing a rescript re-establishing the Constitution, and by fixing July 19th as the date for the election of members of the new *Mejliss*.

July 19th, 1909, saw the Shah a refugee in the Russian legation at Tehran, and on July 21st the announcement was made of his deposition and the accession of the Vali Ahd, or Crown Prince, Sultan Ahmed, a minor.

A noteworthy figure in contemporary Persian politics is the Zil-es Sultan, a brother of Shah Muzaffer-ed-din. This prince, who is noted for the possession of a stronger personality than is common to members of the royal house, has of late years been banished from Persia, on account of his avowed sympathy with the reform party. He has recently returned to Persia, and the fact that his palace at Tehran shared the fate of the parliament house and was burnt by the Shah's orders, during the *coup d'état* of June 1908 has no doubt increased his resentment of the *régime* to which the Nationalist Party put an end in July.

The relations of the Russian and English governments during this period of internal disorder in the country in which they both

possess vital interests have been marked by unity of purpose. The policy which both have recommended has been framed with the view of preserving the integrity of Persia.

Having thus brought the retrospect of our relations with Persia and with Russia in Persia down to the present day, it remains to consider what will be our future policy in that country and, briefly, what steps must be taken to secure to ourselves some measure of strategic security, should we be forced into war in the Middle East.

To the most casual observer of Russian policy in Asia during the last three decades, the determination with which she has pushed steadily southwards, with the undisguised intention of finding an outlet on the seaboard of southern Asia, must be immediately apparent.

Secure in the undisputed possession of her vast territories in northern Asia, she has been free to turn her powers of statesmanship to the acquisition of a littoral from the harbours of which her fleets, both of war and of commerce, may compete with some measure of equality with those of other nations.

Spurred by an ambition, the seeds of which were sown by the far-sighted policy of Peter the Great, her statesmen have neglected no means by which their hope of making Russia the mistress of the world might be advanced. All the resources of diplomacy, aided by the power of the sword, have been called into play towards the realisation of the end in view.

Checked in her efforts to obtain access to Mediterranean waters by her defeat in the Crimean War, and again by the intervention of the Great Powers after her victorious campaign against Turkey in 1877, foiled in her attempt to retain possession of warm water ports in Far Eastern seas, there still remains the line of least resistance, that which connects her trans-Caucasian and trans-Caspian territories with the waters of the Indian Ocean.

It is unnecessary to recall the many attempts which Russia has made to break down the buffer which we have been at such pains to maintain, namely, a united Afghanistan. We may feel assured that Russia would not have acknowledged that country as being entirely outside her sphere of influence (as she did in the terms of the Anglo-Russian Convention of 1907) had she not intended to devote her energies to the attainment of the same ends by simpler means, that is to say, by the russification of northern Persia.

It requires but slight reflection to see that should Russia undertake the improvement of communications in northern Persia with an energy equal to that by which she has settled her Central Asian territories, she will put herself in such a strategic position with regard to India as will practically nullify any advantage which we may have derived from the preservation of the integrity of Afghanistan.

In dealing with the probable direction of railway expansion in northern Persia, the means by which Russia may be able to concentrate troops on the north-western frontier of Afghanistan will

be indicated. She may thus obtain strategic control of Herat and its neighbourhood, without the necessity of breaking any of those pledges which she has given to us.

Turning to western Persia, the terms of the convention of 1907 afford no objection to railway expansion, under Russian auspices, by which the trans-Caucasian system may be extended through western Persia to the Gulf.

If the above prospect as to Russia's future action in Persia be a true one, what preparations, and especially what strategic preparations, can we make so as to enter on the struggle with a fair prospect of success?

Leaving out of the question those means by which we can bring pressure to bear on a possibly hostile Russia at other points of contact, I suggest that we devote a similar energy to the consolidation of our interests in Southern Persia to that which Russia will undoubtedly display in furthering her aims in the north and west.

Both Russia and we ourselves realise full well the part that railways can play, both in civilising the countries through which they pass and in giving access to fresh centres of expansion and development.

But, as regards Persia, there is one marked difference between us. Those who control Russian finances have no objection to pledging her credit in order to develop those strategic means which tend to the realisation of her ends, whereas, with us, the loosening of the national purse-strings is dependant on the probability of immediate profit resulting, rather than on contingencies which are veiled by the future.

This is not to say that we have not many who devote all their energies to the maintenance of the security and integrity of the Empire, but rather, that in order for them to put into practical form the most important of these measures which they feel convinced are essential to our future security, it is necessary either to demonstrate the certainty of immediate profit in pounds, shillings and pence, or resort to the somewhat artificial means of creating a panic.

We see, then, that the first postulate to be observed, if we wish proposals for the security of our interest in the Middle East to take shape, is to appeal to the commercial instincts of our countrymen.

Can we but show that there is a really profitable field for commercial enterprise in southern and eastern Persia, we shall be within measurable distance of providing those means of communication which may prove our salvation in the day of reckoning.

I propose then briefly to review the various suggested lines of railway in Persia, to indicate those which, in my opinion, Russia will probably undertake to construct, and finally to suggest the form which our reply should take.

The physical feature which imposes the greatest obstacle to railway construction in Persia is the high level of the central plateau. This obstacle is least apparent in the north-west portion of the country, where the Caucasian highlands merge into those of the Elburz range and into the central plateau.

We find the first trace of the railway concession-monger in Persia in 1865. Between that year and 1871, various concessions were successively granted to French, Austrian, and German syndicates, but their enterprises failed, chiefly owing to the lack of capital.

1872 was the year in which the Reuter concession was granted. This concession made such a stir in international circles at the time, and might have placed us on such a different footing in Persia, had it been carried through, that it may be as well to refer to it in more detail. It was headed by a naturalised Englishman, Baron de Reuter, and was an attempt to obtain a monopoly of the resources of Persia for a period of seventy years.

The chief provisions were:—

The construction of a railway between the Caspian Sea and the Persian Gulf as well as any other railways which the concessionnaire might think fit. No foreign competition to be allowed. The Persian Government was to hand over all government land which might be required, free of cost, and private owners were to be compelled to hand over their land gratis. The land acquired was to be for a double set of rails and 30 metres on either side. The Government was to provide stone, gravel, sand, etc., free, from its own land. The material required was to be free from all import duties. Government was to receive 20 per cent of the net profits of working and to obtain entire possession of the line or lines after a period of seventy years. The concessionnaire received the right of working all mines, except those for the extraction of gold, silver, and precious stones, Government receiving 15 per cent of the profits. The concessionnaire received the right to work all government forests, as well as land hitherto uncultivated, for seventy years, allowing 15 per cent of proceeds to Government. The concessionnaire was to receive the management of all customs for a period of twenty-five years, in return for an annual payment of £20,000 in excess of the revenue hitherto derived by Government from this source. The concessionnaire was to have the preference in all enterprises connected with the establishment of banking institutions, the provision of gas, roads, telegraphs, mills, manufactures, post offices, and improvements in the capital.

Baron de Reuter, on receiving the concession, immediately set to work on the construction of a line from Rasht towards Kasvin, but work had barely commenced when the pressure put by Russia on the Shah induced him formally to annul the concession.

In 1874, a Russian engineer officer, General von Falckenhagen, strongly backed by the Russian Government, proposed a concession for a line from the frontier at Julfa to Tabriz, being a continuation of the line from Tiflis to Julfa. The Persian Government was to guarantee $6\frac{1}{2}$ per cent for forty-four years on the capital raised, was to grant no other concession within a radius of 100 miles, and was to hand over the customs at Tabriz. These terms were considered too stiff by the Shah, who in 1875 proposed a modified concession in which the Persian Government was to guarantee 3 per cent on the

capital. General von Falckenhagen was unable to raise sufficient capital to work the concession on these lines and the project fell through.

In 1878, a M. Alleon, of a Paris firm, obtained a concession for a line from Rasht to Tehran. The route proposed avoided the Kharzan Pass over the Elburz and lay along the Bakandi Valley. The concession fell through owing to the refusal of the Persian Government to guarantee 7 per cent on the capital raised.

During the next few years, various attempts were made both by American and English firms and by the English Government, but each and all were baulked by the determined opposition of Russia.

In 1882, a Frenchman, M. Boital, obtained a concession for a line from Rasht through Tehran to Bushire, with the right of working all mines situated in the area traversed. The concession was to run for ninety-nine years, but fell through for the usual reason. One, however, of the minor concessions obtained by M. Boital was taken up by a Belgian Company, with the imposing title of *La Société des Chemins-de-fer de Perse*, and resulted in the construction of the first line on Persian soil. The line had a total length of six miles and connected the capital, Tehran, with the shrine of Shah Abdul Azim. The line was opened with much ceremony in 1888, in which year a concession was granted for an extension to Kum, which, however, has so far come to nothing.

In 1891, a Persian merchant received permission to construct a line from Mahmudabad, a small harbour on the Caspian Sea, to Amul, a town on the Haraz River, on the eastern of the two routes connecting Tehran with the Caspian. The line has a gauge of 4' 8½", but is no longer used, and is falling to pieces.

In 1889 and 1890, various Russian proposals were discussed, but as usual came to nothing, largely owing to the influence of the strong party in Persia who are opposed to the introduction of any measures which would strengthen the foreign grasp on the country.

The most important of the Russian proposals at this time were:—

- (i) A line from Enzali to Rasht;
- (ii) A line from Julfa *viâ* Tabriz, Kasvin and Tehran to Bunder Abbas;
- (iii) A line from Julfa *viâ* Hamadan and Burujird to Muham-mareh on the Karun;
- (iv) A line from Tehran to Meshed *viâ* Shahrud.

I will now indicate the more important of the possible lines of railway, commencing with those in the north-west.

The first is the extension of the present Russian line, which has its terminus at Julfa, on the frontier, through Tabriz and Kasvin, to the capital. There are many reasons for supposing that this will be the first line to be constructed in Persia under Russian auspices. It will probably follow the present postal and telegraph route. Not only would such a line place Tabriz, the mercantile capital of Persia, in direct communication with European markets, but it would open

up the wealthy and fertile province of Ajarbaizan. Strategically, it must strengthen Russia's grasp on the northern provinces and the capital, and it would be the first step towards the connection of the trans-Caucasian and trans-Caspian systems.

A corollary to this line would be the connection of Baku with the Persian capital, *vid* Lenkoran, Astara and Rasht, the junction being at Kasvin. The route thus followed is a comparatively easy one, first skirting the Caspian littoral, and then taking advantage of the most practicable of the few points at which the Elburz range can be crossed.

Meshed-i-Sar on the Caspian is a point at which it might be possible to create a mercantile port, and schemes have more than once been mooted for its connection with the capital. A continuation of the Baku-Tehran line eastwards, *vid* Bander-i-Gaz, Astarabad, the Gurgan Valley, Bujnurd, Kuchan to Meshed, with a branch connection from Kuchan to Askhabad on the Central Asian Railway, is perfectly feasible. Lord Curzon, writing in 1892, denies that such a line could have any commercial value, and says that its uses have been nullified by the construction of the Central Asian Railway. The point as to its lack of commercial value is doubtless true, as far as the possibilities of the country through which it would pass are concerned, but one cannot help thinking that should Russian enterprise result in the construction of a line as far as Tehran, there would be a great inducement to continue the line, so that Southern Russia might be placed in direct communication with Central Asia, and the delays consequent on the sea-transit between Baku and Krasnovodsk avoided. Should, however, this line not be undertaken in its entirety, it may be looked upon as almost certain that the next few years will see the linking of Askhabad, the capital of trans-Caspia, with the important political and commercial centre, Meshed.

Other railway extensions which have been proposed, in this quarter, are :—

A line from Dushak, on the Central Asian Railway, *vid* Sarakhs and Pul-i-Khatun to Meshed, with branches to Kushk Post, and through Zulfikar to Kariz. The strategic possibilities of such lines are apparent, more especially the latter, *vid* Kariz, which would give a second and easier line of approach to Herat, by the Hari Rud Valley.

Returning to Tehran, the direct connection of the capital with Meshed by a line south of the eastern Elburz, through Shahrud, has been frequently discussed. Considerable quantities of grain are produced in the area between Tehran and Shahrud, and the railway would give direct access to the bazars of Khorasan.

Turning to western Persia, a well-developed trade route exists between Baghdad, in Turkish territory, and Tehran, *vid* the important city of Kirmanshah, and Hamadan. Russian enterprise may well undertake the development of this route, more especially should the Baghdad railway ever be constructed.

Similarly, it is to be expected that attempts will eventually be made to carry the railways to the important centres of Isfahan and

Yazd, both of which are in the Russian zone. The two alternative routes between Kum and Isfahan *via* Kashan and Gulpaigan, respectively, are shown on the map. A cross connection between Gulpaigan and Kirmanshah, by Burnjird, appears feasible.

A line Julfa, Tabriz, Tehran, Isfahan, Yazd might prove the nucleus of the trans-Persian line, which has been the dream of more than one railway concession-hunter.

This finishes the survey of possible railway construction within the limits of the zone given over to Russian influence, by the terms of the convention of 1907. To those who may consider these suggestions as exaggerated, on the grounds that Persia still belongs, at any rate in name, to the Persians, I would commend the perusal of "The Russian Army and the Japanese War," by General Kuropatkin. The glimpses which are given of the determination displayed by Russia in the matter of territorial expansion, and the skill with which she has before now set herself to the exploitation of territory belonging to a weaker nation, offer food for thought as to the direction to which her energies may be applied in the russification of Persia.

Finally, I will run through the various ways in which we may utilise railways and their construction to combat these Russian aims by consolidating our position in the country.

On the map, distinguished by figures, are shown the railways which, in my opinion, best fulfil the conditions we require, namely, commercial and strategical possibilities, and the extension of British influence. The figures refer to the sequence in which it appears desirable that the construction of the lines should be undertaken.

First I would suggest the construction of a line following the Karun Valley route, from Muhammareh to Shushtar, with a possible extension through Dizful to Khurramabad. It appears important that we should negotiate without delay for a concession for the construction of this line, since, as it is in the neutral zone, it is by no means improbable that Russia will take steps to establish control over the most direct route from her territory to the warm waters of the Gulf.

Prior to the convention of 1907, it was popularly considered that any attempt by Russia to construct a railway with a terminus on the Arabian Sea would form a *casus belli*. By this convention we have undertaken not to oppose any concession within the limits of the neutral zone. If we wish to fulfil the pledges we have given, should we not take steps, without loss of time, to forestall our rival and so to maintain the inviolability of those waters, over which we have for more than a century acted as sole guardians?

As to the value of the railway itself, it is conceded to be the most convenient route by which sea-borne trade may be brought to the markets of northern and western Persia. The line would pass through a region which produces a large quantity of grain, and would surpass in value the Trebizond Erzeroum route, by which our merchandise now reaches that portion of Persia. The route has been greatly developed by the enterprise of Messrs. Lynch, who have

constructed good bridges where necessary, and ~~have~~ made, and maintain, a good road from Ahwaz as far as Kum. A point of no little importance in connection with this route is that it passes through the territory of the Bakhtiari, who, as recent events have shown, are the most virile of the tribes of Persia, and who have always shown a leaning towards more direct relations with Great Britain.

In passing, reference must be made to the Baghdad railway.

Although the proposed route does not enter Persian territory, it flanks it for some 500 miles, while the suggested branch from Baghdad to Tehran would cross the frontier near Khaniqin. There can be little doubt that if the southern section is ever constructed, it should be by British capital and under British auspices. There are signs that Germany's interest in railway construction in these parts has, at any rate temporarily, flagged, and the opportunity may arise of our obtaining the power to undertake this portion of the construction, which, especially in view of the probable development of Mesopotamia, we should not let slip.

The next line which it would appear desirable that we should contemplate, is the extension of the Nuskhi railway into Sistan. We have the authority of Sir Henry McMahon as to the immense possibility of development in that region. From the traces which remain of its former greatness, and more especially of its marvellous system of irrigation, there seems no reason why a regeneration should not be undertaken, similar to those which have recreated Egypt and are to recreate Mesopotamia. Strategically, the construction of such a line should strengthen our grasp on southern Afghanistan and would assist us to combat Russian aggression on the western frontier of that country. Probably, the best line would be that of the present trade-route through Dalbandin.

Third in importance, I have placed a line connecting Chahbar with the most important city in our zone, Kirman. Chahbar is the harbour on the Persian coast which offers the best opportunities for development, since it possesses few of the natural disadvantages of Bandar Abbas and Bushire. The line would pass through the fertile districts of Rigan and Bam, and there is reason to suppose that it would pay commercially. Politically, it would pass through the heart of the region allotted to us by the 1907 convention, and should form a bond between ourselves and the inhabitants of south-eastern Persia. If the project of a trans-continental railway ever comes to anything, it seems not unlikely that this will be the route which the line will follow. In such a case, it would be to our advantage to obtain control of the section which crosses the neutral zone between Kirman and Yazd.

The physical difficulties, and the impossibility that it should be a paying concern, seem sufficient reasons for dismissing any idea of a direct connection between the proposed Baghdad line and our existing Indian system.

The other lines shown on the map indicate such further extensions as may eventually be desirable, though it is scarcely likely

that any inducement may offer for their construction until those already indicated have developed.

Bushire is the most important centre, both of political interest and of trade, on the Persian coast, and there is much to be said in favour of linking it with the important cities of Shiraz and Kirman. It is, however, probable that this would be as difficult a piece of engineering as could be undertaken on Persian soil.

The lines shown as passing through southern Baluchistan would give a direct communication with our Indian system, without the necessity of transhipment or of using the Bolan route.

It only remains to repeat that since railways in Persia are practically non-existent, much of what has been said is pure conjecture. A good deal has been written on the subject, notably by Lord Curzon, but in considering the views expressed in his book "Persia," it should be remembered that this was written some seventeen years ago, since which many events have taken place, which have complicated the problem we have to face in that country. Russia has shown us what she is capable of in the matter of railway construction, and from her experiences in the Far East she has learnt lessons which, unless we make adequate preparation, will no doubt be put into practice when it comes to the battle for the mastery of Persia.

For the facts on which this lecture is based, I am mainly indebted to the following books:—

- "Persia and the Persian Question," by Lord Curzon;
- "England and Russia in the East," by Sir H. Rawlinson;
- "The Middle Eastern Question," by Valentine Chirol;
- "Russia in Asia," by Alexis Krausse, and
- "Scistan and Khorassan," by Colonel Yate.

As to that part of the lecture which does not deal with facts, I have set down the conclusions at which I have arrived, not because they are in themselves of any value, but in the hope of promoting discussion on an important problem which we, as a nation, shall have to face in the future.

SOME MODERN FRENCH IDEAS ON THE EMPLOYMENT OF ARTILLERY.

**A Lecture delivered at a meeting of the Quetta Military
Society in January 1910.**

BY MAJOR-GENERAL F. J. AYLMER, V.C., C.B.

As is doubtless well known to all of you, the French were the first to introduce shielded Q. F. artillery over 12 years ago. They have gradually evolved what they call a "doctrine" as regards its employment; but it is only during the last two or three years that this "doctrine" has been published in something like a definite form. I think there can be little doubt that their ideas on this matter are very considerably in advance of those of any other nation. Their apparent ambition has been to evolve a system by which an artillery, inferior in numbers, may, when scientifically managed, have a chance of successfully contending against a more numerous one not so skilfully manœuvred, *viz.*, their own artillery against that of Germany. We are always being taught to believe that our army must for ever remain a small one, so it is obvious that this artillery "doctrine" should be of particular interest to us.

This doctrine is essentially one of combination between infantry and artillery. Its chief authors have been Generals Langlois and Percin, both very able and practical soldiers. In some ways General Percin goes further than General Langlois, and, as far as I can judge, he is now accepted as the leading authority by most of his countrymen. I shall consequently generally confine myself to his views.

Every soldier must once for all accept the fact that infantry is the principal arm and that the other arms are only there to assist it. Independent action on the part of artillery is dead; from the first moment of a battle to the last, artillery must work for and with the infantry, and artillery officers must recognise the fact that infantry officers know their own wants better than they do. Though they may often be able to inflict terrible losses on the enemy, while acting with the infantry, their principal object and ambition must be to make it possible for the infantry to inflict losses and gain the victory. Their own feelings and their own glory must be subordinated to this.

Except under extraordinarily favourable circumstances batteries in the open have no chance against covered artillery. If they are lucky enough to escape destruction in coming into action they will almost at once be neutralised when they have done so. The importance of cover

to batteries in action, and of covered lines of approach to such cover, cannot be exaggerated.

Natural cover is of several kinds:—

Full cover.—Where the enemy cannot see the flashes of the guns or the dust thrown up by their fire—*vide* fig. 1.

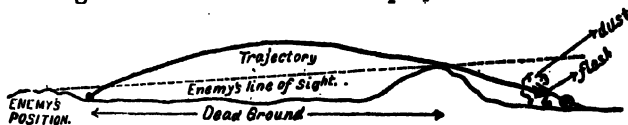


Fig. 1.

With full cover it is most difficult for the enemy definitely to locate our battery, or to do it much harm without an excessive expenditure of ammunition. Such a battery can come into action undisturbed, and fire almost as at practice, uninfluenced by the demoralising effects of being itself under fire. It has, however, the very serious disadvantage that there is a great deal of dead ground to its front over which the battery can have no effect. Thus it can do nothing against the enemy in attack, or counter-attack, once he reaches this dead ground, and has great difficulties in defending itself should the enemy approach it. Full cover makes it necessary to separate batteries by considerable intervals in order to get good and suitable observing points.

Partial cover.—Where the enemy can partially see the flashes of the guns and the dust thrown up, but cannot make out the actual guns—*vide* fig. 2.

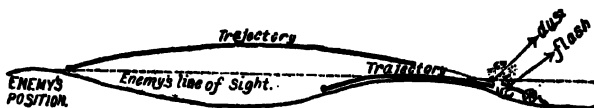


Fig. 2.

With partial cover our battery should be invisible till it opens fire, and even then only very little should be seen. It must be hard for the enemy to estimate our strength, to range or to observe. We have little dead ground to our front and our observation is greatly simplified, the Commanding Officer remaining near his battery. We are thus able closely to support our infantry against counter-attack throughout their forward movement, or to fire constantly at the enemy during his advance. We are able to defend the artillery itself against attack and to move up quickly on to the crest line or beyond when it becomes necessary.

Lateral cover—When a battery is covered by a lateral screen giving full cover from a large portion of the enemy's front,

but can still fire over a considerable portion of the field from partial cover—*viz* fig. 3.

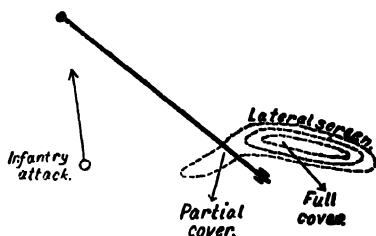


Fig. 3.

This gives us many of the advantages of both full and partial cover. It limits our field of fire, but when the permanency of artillery missions is considered this disadvantage is a small one. It is evident that such a position must be considerably to the flank of an attack which is being supported by fire from it.

Of the above forms of cover the most important is that of partial cover. It will nearly always be available when the other forms of cover are wanting. If they are available they can be used for certain batteries or groups with great advantage.

Natural cover should always be improved when time and circumstances allow. When not otherwise stated in what follows, batteries are considered to be under partial cover.

When Q.-F. artillery is firing at its utmost speed, *viz.*, using *refuses*, and the ranging is correct, its effect is to inflict such serious losses as to shake the *moral* and stop the progress of any considerable uncovered body of troops in close order within effective range.

**Artillery effect. Neu-
tralisation.**

The shields of Q.-F. field artillery, when in action, afford a large amount of cover to the gun detachments from direct or nearly direct hostile fire; the losses will only be one-sixth of those of an unshielded battery. But even with shields, when a battery is smothered by hostile artillery fire, it will generally be impossible to continue firing, and the personnel will have to seek cover till the storm is over. The destructive effect of field artillery fire against troops in good trenches is not great; it prevents them firing but does not destroy them. The effect of field artillery fire on material is very small indeed; guns and carriages cannot as a rule be destroyed.

For the above reasons infantry in good trenches, or a shielded battery in action, can only be silenced temporarily by artillery fire. If left alone, they will quickly come to life again and be almost as dangerous as before. On the other hand, masses of infantry in the open will suffer extraordinary losses and become totally disorganized, while a battery caught on the move will in all probability be rendered immovable and useless for the rest of the battle, its men

and animals being destroyed. The above is a fundamental principle of the doctrine, and it is expressed by saying that shielded batteries in action and infantry in good trenches, unless in exceptional circumstances, can only be *neutralised*.

With the present possibility of Q.-F. shielded artillery using covered positions, numbers do not, as they used to, count for everything. The artillery, inferior in numbers, *will* not show itself. It will lie in wait. If the artillery, superior in numbers, is incautions in taking up its positions it will be overwhelmed and neutralised. However cautiously it is brought into action it will find no target till the advance of the infantry compels the enemy to show one.

The preliminary artillery duel, as an independent action, has gone for ever. No general, if he really considers the question, will ever trust the issue of the whole battle to the preliminary and independent action of an auxiliary arm. We require artillery support for our infantry *throughout* the battle. If we have not got it, and the enemy has, the battle is already lost. If we engage in an artillery duel we risk the neutralisation of the whole of our artillery before the infantry has fired a shot.

A Q.-F. gun can fire, at top speed, within an hour, all the ammunition for it with the army. Consequently *rafales* cannot last long. For

demoralisation and neutralisation we require the sledge-hammer blow of the *rafale*. Slow fire will be rare. Consequently there must be long pauses in the fire, during which the personnel may be taking cover, or, if not seriously affected by hostile fire, may be waiting ready to let loose another *rafale* when they get a good opportunity.

The difficulty of supplying sufficient ammunition has the effect of tying the battery down to its first target for considerable periods. If directly we had neutralised our first target the battery were turned on to another, it is evident that unless slow fire were used our ammunition would be expended in a very short time. If we use such slow fire the effect will not be great, and the object of the change of target could be better effected by making some other battery, more directly responsible for the second target, maintain its rapid rate of fire.

Owing to the great difficulty of judging the strength and exact positions of hostile covered artillery on any part of the field (since we can only detect vague flashes and perhaps a little dust), our artillery targets will usually have to be certain frontages of the hostile position and not certain guns or batteries.

A French 4-gun battery is said to have a full effect over a hostile frontage of 200 metres, and this is the normal frontage allotted to a battery to fire on, or observe when neutralised. Now, if, say, three hostile batteries lie within this 200 metres front, which

our one battery is firing on, each of the three hostile batteries will suffer the same loss as a single battery within the same frontage; and *vice versé*, owing to inaccuracies of ranging from a covered position on a vague target, we are ordinarily unable to inflict on a single battery within this frontage a greater loss than on each of three batteries within it. Hence arises the power of one favourably situated battery to neutralise twice or three times its strength of artillery less favourably situated, provided that this hostile artillery is engaged in firing on something else. Our one battery will so smother the enemy that he can neither continue firing on the other target nor go through the difficult performance under fire of replying to our one battery.

In what follows the word "battery" is used in the singular for simplicity, but it must be held to cover either

The Infantry Battery.

a portion of a battery or several batteries told off for a particular task.

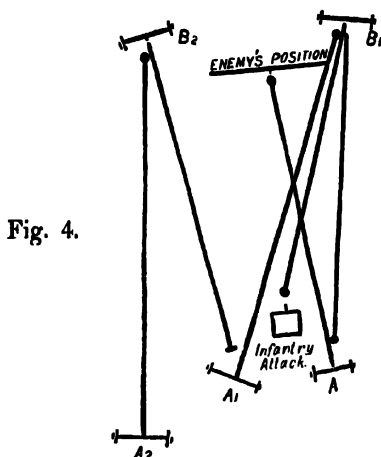
The infantry battery—*Batterie d'infanterie*—is one which is detailed to remain in immediate association with an attacking infantry unit. Such a unit may be a battalion, a brigade, or even more. This battery fires at the hostile front which is the objective of the attack of that infantry unit. It fires, as a leading principle, on the enemy's infantry, and compels that infantry to remain under close cover in its trenches, thus making it difficult and very costly to oppose by fire the advance of our infantry to the attack. If we are on the defence it fires on the enemy's advancing infantry. It must be in a position to engage a hostile counter-attack on our advancing infantry. It will usually have to be under partial cover, and may have to advance in the open to the closest ranges in support of our infantry. It is attached to the infantry unit for a particular task by the general commanding both infantry and artillery, and, its mission completed, it rejoins the bulk of the artillery.

We wish to obtain for this infantry battery freedom of action.

The Counter Battery.

We want it to remain unopposed by hostile artillery. Action in war, however, being reciprocal in its nature, the enemy, having located our infantry battery, will certainly engage it with a portion of his artillery. He will also engage with some artillery our advancing infantry. Our infantry battery does not reply to this hostile artillery counter-attack, but continues as long as it can, and whenever it can, to fire on its original objective, *viz.*, the enemy's infantry. If the enemy's artillery counter-attack remains unopposed our infantry advance and its attached infantry battery will quickly be brought to a standstill and neutralised. If our infantry battery is properly handled it will not be destroyed. It can come to life again, and our infantry advance can again progress if the enemy's artillery counter-attack on them ceases or is made to cease. With this object we bring one or more batteries into action against the enemy's artillery counter-attack. This is a counter battery (*contre batterie*). The enemy then brings a counter battery against our artillery counter-attack

and so on. The principle is perhaps more clearly shown in plan—*vide* fig. 4.



A is our infantry battery firing at the enemy's position, which our infantry unit is attacking. The enemy's counter-battery B₁ opens on our infantry attack and on A.

Our counter-battery A₁, which is on the watch, opens on B₁.

Similarly the enemy's B₂ opens on A₁, and our A₂, also on the watch, on the enemy's B₂, and so on as long as necessary.

We will suppose that, for some good reason, such as being unlocated, A₂ is unopposed. A₂ can then neutralise B₂, which will free A₁ to neutralise B₁, which frees our infantry from hostile artillery fire and our infantry battery A from neutralisation, so that it can carry on its task of helping on its infantry attack by firing on the infantry in the enemy's position.

It will be noticed that no battery is firing at the battery which is firing at it. As we have already shown, a favourably posted battery can neutralise several partially covered batteries on a frontage of 200 metres just as well as it can neutralise one battery on the same frontage, provided the several batteries are already engaged on another objective. Hence, if the enemy has grouped more batteries than necessary at B₁ and B₂ we see the possibility of neutralising them with a smaller number of guns well placed at A₁ and A₂. In fact, a skilful disposition of an inferior artillery may go far in overcoming a superior artillery posted less carefully and without a regular method.

It has generally been the custom for the general to allot positions to the artillery and then tell it what it is to do. The exact opposite should be the case. He should give the artillery clear instructions as to what it is to do, *viz.*, its "mission," and leave it the choice of its positions and dispositions. He should apply to it, as to the other arms, the

The mission.

simple and useful principle of the division of labour; a task should be allotted, and the means of arriving at its solution left to the performer. Moreover, if we are to adopt the scheme of artillery tactics outlined above, it is obviously impossible for the general to detail such a complicated series of positions as are necessary, especially as their suitability only becomes apparent as the engagement progresses.

It must be remembered that we are dealing with a power which neutralises but does not destroy. The mis-

Permanence of mission.

sion of one battery must thus last as long as the phase of the combat which it is supporting. It is a tactical necessity, and it is described by the expression "Permanence of mission." Owing to the difficulty of ranging on a fresh covered objective from a covered position in the stress of battle, changes of position and objective are not to be undertaken lightly. The manoeuvre of trajectories is all very well in a scientific book. Our counter battery has neutralised a hostile battery. It is not therefore available to fire on something new or to go elsewhere. It must keep guard over the hostile artillery which it has neutralised, or that hostile artillery will come to life again.

Such permanence of mission has its common sense limits. Our infantry battery, after the completion of a phase of the battle, may be given a new mission and become a counter battery. For example, our infantry unit attacks an advanced hostile position. This attack is of importance and requires close artillery support; an infantry battery is associated with it. When the hostile advanced position is taken, the further advance of our infantry unit may be easier or less important than that of neighbouring infantry units. Then the infantry battery may be taken away from it and given a new objective or mission. Again, our counter battery having silenced a certain frontage for a long time, and the enemy's artillery within that frontage having shown no sign of reopening fire, the time comes when we can give it a new mission.

It is not easy to realise the real difficulty of the problem with

Economy of force.

which our artillery has to contend as regards its targets. All that a well instructed hostile artillery will let us see are momentary and indistinct flashes and perhaps some dust on a certain front; and it has been found from experience that it is advisable to allot our counter batteries, not according to the number of hostile guns that we may vaguely guess lie within that frontage, but according to the extent of that frontage, and for this experiments have given us certain figures. It is just because we do not really know what is in front of us, or what there may be elsewhere, that it is prudent not to bring into action, against what we think we have seen, all available batteries. We have seen how one battery may, under favourable circumstances, neutralise several batteries firing at something else. If we rush a large mass of artillery into action against the first visible target, we run the risk of having it neutralised by one-half or one-third its

strength of hostile guns opening on it from unexpected directions and the enemy will be left with some free batteries which will go far towards winning the victory.

We must use up our artillery gradually, and we must apply to it, as to the other arms, the principle of "economy of force." This is the direct result of the use of covered positions on both sides.

Concentration of fire, in the ordinary sense, has lost much of its importance. The same effect is produced, and produced more quickly and more accurately, by rapidity of fire by Q.-F. artillery. The superposing, on the same hostile front, the fire of several batteries is technically difficult if under fire, and will lead to an unnecessary expenditure of ammunition. There may be times when it is possible and desirable, but they will not be common. Hostile batteries are only neutralised not destroyed, and if a considerable number of our batteries concentrate on one target, the neutralised batteries are nearly certain to come to life again and take our batteries, which have concentrated their fire, at a great disadvantage.

Even in the decisive attack, any batteries which are free, over and above those required for lashing with shrapnel each 200 metres of the front attacked, or in keeping watch over the enemy's batteries which are neutralised, will be better employed in watching for a possible counter-attack, or in taking the place of those batteries which must be pushed on to the closest ranges with the infantry, so as to avoid any interruption of fire in the process.

At first sight the principles outlined above would appear to lead to the abolition of all power of superior command in the artillery. Turning to fig. 4 we see what appears to be an endless zigzag of targets which may be prolonged indefinitely to either flank. Such however is not the case. A defensive position does not resemble the great wall of China. It consists of a number of *points d'appui*, or defensive localities with gaps between them, gaps, however, which are so arranged that the flanking fire from the *points d'appui* makes it impossible for the enemy to penetrate between them till they are taken. The battle consequently rages round these *points d'appui*. A unit of the defence defends each, and a unit of the attack attacks each. The importance of each will vary, and the forces devoted to each by attack and defence will vary with it, though all will usually be attacked so as to hold the enemy to his ground. An attack on any one *point d'appui* will naturally engage the attention of the artillery near it. More distant artillery may take part to a certain extent, but distance alone soon limits the amount on account of excessive range. Batteries, too, which are far to the flanks, expose themselves to oblique or enfilade fire, which is most dangerous, as the shields then become of no value as protection. Most batteries engaged will be under partial cover only, but here and there we shall be able to place a counter battery under full cover. It will be most difficult for the enemy to locate this

battery, and it will be free to exercise a neutralising effect out of all proportion to the power it would have if being fired on. Such a battery will often have the effect of ending the series of batteries or groups of batteries which come in to action round one *point d'appui*. The artillery commander, after receiving his mission from the force commander, would gradually allot his batteries till the artillery force is sufficient to render the infantry battery free in its action. Any batteries he has left would be available for work elsewhere or for strengthening the infantry battery. He certainly gives up commands of the infantry battery or batteries temporarily, till their immediate mission is completed, but under orders from the general he allots to them a new mission when this is the case. He similarly allots new missions to the counter batteries when their first missions are completed. He is responsible for a judicious use of the principle of economy of force; he must judge when and how he can allot new missions; he must be a thoroughly good judge of infantry tactics; he must know how to harmonise the action of field guns with that of heavier forms of artillery; and he must provide for the replenishing of ammunition.

What commander in the field can exert more influence than this? Artillery commanders must be content with the powers that other commanders possess, and must cease to sigh for the times when they could personally direct artillery duels, order masses of artillery about the field as if on the drill ground, and execute manœuvres with the trajectories of all the batteries under them.

Connection between infantry and artillery must be maintained

Connection between infantry and artillery. by a double process, *viz.*, from above and from below.

Connection from above.—The general commanding the combined force of infantry and artillery must explain his object clearly to the commanders of both these arms, if possible at the same time. He gives to each his mission and each must understand clearly what the mission of the other is. For example, the general says to the infantry commander, "You are to take the village of X," and to the officer commanding artillery, "You are to support the infantry attack on the village of X with one infantry battery, and are to counter-attack the hostile artillery which may come into action against that attack."

During the course of the action he keeps both commanders informed as to the position of affairs, and assigns new objectives to both when necessary, remembering to tell each what his orders to the other are.

Connection from below.—In order that connection from below may be a reality, it is necessary that the infantry should constantly understand what the artillery associated with it can and cannot do, and that, on the other hand, the artillery should constantly know the wants of its infantry.

The artillery should not fire a single shot which is not justified by a want of movement of its own infantry, or by a menace or manœuvre of the hostile infantry.

In order to ensure the harmony of artillery fire and the wants of the infantry, it is most advisable that the artillery commander should see the infantry which he has to support. This does not imply that his guns should be in the open, but that he should have a good point for observation. It is necessary that he should attach artillery representatives to the infantry, and that he should maintain communication with the infantry by all means possible and available, *viz.* signalling, telephones, and orderlies. He should know the resistance his infantry is experiencing, the point where it is held up, and the new advance it proposes to make, so as to be able to assist its progress by fire or new dispositions.

The infantry commander, assisted by the artillery representative, should send the commander of the infantry battery all information which can assist him to help the infantry. A similar intercourse must exist between the infantry commander and the commander of the other batteries associated with the attack, though such communication will be of a more general character.

The artillery representative with the infantry must be a man of sound general knowledge, well acquainted with infantry tactics and formations. He is directly under the command of the commander of the infantry unit to which he is attached, but he will often be able to communicate from himself useful information to the artillery which the infantry commander in the stress of battle might forget to do.

Unfortunately, owing to the rapidity with which operations take place at manoeuvres, such inter-communication can only be carried out in a very sketchy manner, but we must strive to make it as realistic as possible, for that which is not practised in peace is nearly certain to be omitted in war.

Such are the rough outlines of the modern French doctrine of the employment of field artillery. It is a system of action, and a general guide to all which differs considerably from the regulations of our own or of foreign armies.

Conclusion.

It is, however, to be noted that our own regulations seem in places to be influenced to a certain extent by this doctrine. The German regulations were written before it became public property, but there are strong indications that the Germans are fully alive to its importance. The Austrian General Rohne, a well-known military writer, has published an article which appears highly to approve of this French doctrine. There is something in it that the ordinary man can understand: a reality and a continuity of ideas. It is true that there are many difficulties in it, but these will all be solved by actual trial and experience.

SOME MORAL FACTORS IN WAR.

BY CAPTAIN G. M. ORR, 11TH K.E. O. LANCERS.

In war there is nothing more important for a leader than the knowledge of the effect of certain things on the human mind. No excuse is therefore made for putting forward some remarks on such moral factors as the value of an "offensive spirit" in an army, and the need of a definite plan in the mind of a commander.

Nothing perhaps was more remarkable in the wars of the 19th century than the revelation, in 1866 and 1870, of what can be effected by an army imbued, by peace-training, with the "spirit of the offensive." It neutralised the dangers which were incurred by want of reconnaissance, as at Sadowa in 1866, and by the somewhat rash and even dangerous initiation of battles, as at Spicheren, Colombey, and Rezonville in 1870. No doubt the existence of the spirit was vitally necessary to the enveloping form of strategy adopted by the Germans and copied by the Japanese in 1904. Not the least advantage that it carried with it was the "spirit of comradeship." The one idea of every man and commander seemed to be to press on and help his neighbour, get him out of his difficulty if necessary, but anyhow sweep on against the enemy with him.

On the 18th July 1904 the leading brigade of the 12th Japanese division, which was on the extreme right of the advance of the 1st army towards Liao-Yang, came upon a Russian force entrenched in a strong position at Chiao-Tou. There was no hesitation in attacking. Finding the position too strong for a frontal assault, three out of the eight Japanese battalions were at once sent round on a long and isolated march through the mountains. From 8 A.M. to 1 P.M. of the 19th July the Russian commander had an unique opportunity of overwhelming the Japanese turning force. He remained passive and eventually retreated. The Japanese tactics were daring in the extreme, but the lack of any "offensive spirit" in the Russians had been made evident by their bearing throughout May and June. The Japanese generals had correctly gauged their opponents.

The antithesis of the desire to manœuvre and attack is the predilection for taking up positions. While the Japanese had learned the secret of the success of the Germans, the Russians would appear to have acquired the peculiarities of the French in 1870, without learning lessons from the failure of their methods. The "belles positions militaires" of Frossard and Bazaine, found their counterpart in the occupation of positions by the Russian generals everywhere in Manchuria. When the 10th Russian corps was ordered east on the 21st July, under Sluchevski, against the 12th Japanese division, great stress was laid on the importance of "advancing methodically,

and of fortifying each successive position." "If the enemy attack, the corps will take up a position. . . ." In every action dependence on "positions" killed all offensive spirit in the Russians, as it had done in the French in 1870. The outcome was invariably retreat. Whether the force had at its head, as at Yang Tzu-Ling, a Keller, himself full of energy, and conscious of the paralyzing effect of positions on initiative and of the advantages of the offensive, or whether it was, as at Yu-Shui-Ling, a Slucheyski, hypnotised possibly by his training as an engineer, the end was always the same.

In a hilly country positions will always be at hand to tempt such a man. They seem so easy to defend if attacked. Unfortunately a sensible enemy does not attack them, but turns them. Many positions, too, which at first sight appear strong, allow the attack to bring effective covering fire to bear on them, as at Spichen in 1870. This defensive attitude, even shunning a counter-attack, possessed the Russian leaders as it had done the French. Manœuvre was never attempted. Yet manœuvre, with the greater possibility of surprise in such a country as the mountainous regions south-east of Liao-Yang, alone has the power to make an enemy, not inferior in *moral* or training, blunder; and to take advantage of such a situation there is only one course—to attack. It may be said in defence of the Russians that it was Kuropatkin's well-known intention to remain on the defensive, and even go on falling back, until reinforcements made his army strong enough to take the offensive. Such a plan may have been sound, but it would appear that he failed to estimate the effect of such an intention on the minds of his subordinates. It would have been one thing to have fallen back until his army was superior, and meanwhile to have fought no battles, but it was quite another matter to allow every portion of his army to be defeated, at the Yalu, at Telissu, at Tashih Chiao, at Yang-Tzu-Ling, and still to remain on the defensive, and keep on falling back.

One of the consequences of a purely defensive attitude, in opposition to an offensive spirit, is the fear of losses. No decision can be obtained without attacking; in an attack losses must be endured. The offensive spirit which never lets a commander miss an opportunity, no matter what it may cost in lives, is the spirit which secures victory and, in the end, often causes fewer losses than a more cautious one, because it shortens campaigns. It is difficult to find stronger evidence of the bad effect of such a fear in an army than Stackelberg's suggestion at Ta-Shih-Chiao, that the Russians should retreat, because, "if he was compelled to occupy the forward trenches, he would suffer heavy loss, and that, in his opinion, this would not be in accordance with Kuropatkin's plan of campaign."

It is the usual mistake after every war to believe that the secret of victory has been discovered in some new form of tactics, or instrument of war. In 1866 it was the needle gun; in 1870 envelopment and superior artillery. We have shown above the effect of "a spirit of offence," as opposed to "a defensive attitude." It is not

too much to say that the side which succeeds is that which generates a superiority in all the moral forces,—forces which can be felt, though not measured. It is therefore our duty to develop in our men the right moral forces by every means in our power.

It is well known that in a crowd, a sudden impulse will affect men, and produce curiously concerted action. The knowledge of this "psychology of crowds" has often been used by leaders of men. After all, an army is a crowd with a common training, and therefore easier to move than any other crowd to unanimous action. Hence the spirit which impels an advance, or a passive defence, or a retirement, may well have been transmitted by the leaders. *

In seeking for the cause of defeat, too little attention is paid to the environment of the commander, and his difficulties. What were his feelings when he disposed his troops? What spirit did he transmit to his subordinates, and they to the men? Did he show his confidence in their ability to carry out his plan? Above all, had he a definite plan, and did he explain it to his lieutenants? What measures did he take to control its progress without undue interference?

The Germans in 1866 and 1870 had only one plan—"to seek out the enemy, and destroy him." Those who have studied 1870 will know that, on the other hand, in no action, from Weissenberg to Gravelotte, did a French general fight with any definite intention; and in every battle they failed. The result was the same with the Russians in 1904.

In April 1904 Zasulich had been sent to the Yalu to delay the Japanese advance, but not to become involved. It appears at first sight that he deliberately disobeyed his instructions, which indeed Kuropatkin continued to impress on him even during the battle. Yet a general who meant to stay and fight would hardly have led his general reserve off the field without employing it. The reason of his defeat must, to a great measure, be put down to the want of knowledge of his intentions by his subordinates; for instance, on 30th April, Kashtalinski had suggested a withdrawal, but Zasulich replied at that time that the troops were at no point to evacuate the ground occupied.

In June 1904, Kuropatkin's lack of decision in his instructions to Stackelberg may be attributed to pressure from above, and to the fact that they were in opposition to his own judgment. The effect on Stackelberg was to make him morally inferior to his opponent. He did not know what to do; his indecision in turn was communicated to his lieutenants, and by them to the troops. After enjoining a vigorous attack by Gerngross and Glasko, he finally threw doubt on his intention by bidding them retire if the enemy advanced in any strength. His first orders left Glasko in ignorance of the hour to commence, his second made the proposed line of action doubtful. The result was lack of cohesion, then confusion, and finally retreat.

* Colonel H. V. Cox referred to the "Psychology of crowds" in the above sense in a lecture delivered at the Simla Town Hall in September 1908. Also see the works of Gustave de Bon.

At the battle of Ta-Shih-Chiao in July, Zarubaiev, the Russian commander, cannot be said to have had any plan. An intention to attack was transmitted by him to his subordinates by ordering Shileiko to "come to an understanding on the subject" with Mischenko. The latter was, fortunately, "pleased to agree," but another general "refused"! Is it a wonder that, while these negotiations for an attack were taking place, the opportunity passed by! Having no real plan Zarubaiev was unable to initiate definitely a concerted attack.

A study of the events which took place between the 24th August 1904 and 3rd September brings out in the strongest possible manner the fatal influence on an army of a spirit of passive defence among the higher leaders. The orders, counter-orders, and instructions of the Russian commander-in-chief show only too clearly the absence of plan, and the mutual want of confidence between chief and subordinates. With all due regard for the immense difficulties which surrounded Kuropatkin in his action as commander-in-chief under the control of the Viceroy, Liao-Yang will ever remain an example of a battle in which it was the commander who was defeated and not the army: another proof, if one were needed, that the moral is to the physical as three to one and that psychological factors reign supreme and must be studied.

On the 24th August it would appear that Kuropatkin had decided to offer a strenuous resistance on the line An-Shan-Chan—Lang-Tzu-Shan—An-ping, and to take the offensive should any favorable opportunity offer. Nevertheless, his orders to group commanders contained no suggestion of attacking the enemy. Von Tettau says the commander of the 10th corps got an intimation of a possible offensive move. However, on the 26th, when the time was ripe for a move against Kuroki's exhausted troops, an order came direct from the commander-in-chief to the commanders of the 3rd and 10th corps to retreat*. The reason apparently was that Kuropatkin feared for the flank of the 3rd corps. To remedy such a situation his mind turned instinctively to retreat. Was that the way the commander of an army imbued with the spirit of the offensive would have treated such a situation? Did Kuroki order a retreat because at a critical moment his right flank was threatened on 1st September by a considerable force? No,—he ordered a brigade forward to the attack. In the orders that the Russian southern group commander received for the strenuous resistance on the position of An-Shan-Chan, he was told "to retire as soon as he was convinced the enemy was advancing in superior force."

"When night fell † on the 29th August 1904 both the Russian and Japanese commanders might fairly claim that they had carried out the intention with which they had opened the campaign. On the one hand, General Kuropatkin had concentrated his forces upon carefully-prepared ground of his own choosing. On the other

* This order was not sent through the group commander.

† British official history Russo-Jap. War, Part IV, page 54.

hand, Marshal Oyama had completed his converging movement. An unbroken series of successes had brought the Japanese within sight of the town of Liao-Yang, and they were now face to face with the position which had long been recognised as the ground upon which the first great battle of the war would be fought. They had, therefore, gained the immense moral advantage which inevitably accompanies a successful forward movement, but they had not succeeded in enveloping their enemy, for unforeseen delays had enabled the Russians to concentrate superior numbers upon the chosen battle-field. By the evening of the 28th it was clear that the most critical moment of the land campaign had arrived, and Marshal Oyama must have realised that the task before him was very formidable. Yet there was no sign of hesitation, nor, so far as has ever become known, were there any of those preparations for defeat which figured prominently in every Russian plan of battle. On the evening of the 29th August, Marshal Oyama issued his orders for the attack.* On the morning of the 29th August Kuropatkin had issued his orders for the occupation of his 2nd line of defence.* They read, "Should the enemy advance further, the army will offer a determined resistance in the fortified position on the line of the villages. . . ." It may be asked, what was the army to do, if the enemy did not advance any further? It may be said the disposition of the army would show that a strong counter-attack with the general reserve was intended. In addition to numerous flank detachments and a garrison in Liao-Yang, there were 112 battalions, 43 squadrons, and 368 guns disposed in the fortified line, while 59½ battalions, 33 squadrons, and 110 guns were in the general reserve. We find, however, that "General Kuropatkin spent the nights of the 30th-31st August trying to regain control of the reserves, which had been distributed during the previous day"; that, although the ground in the western section was favourable for a counter-attack, he preferred to use his reserves to strengthen each point of his line as it was threatened.

On the 30th August, the Russians had everywhere held their ground, and at midnight on the 30th-31st Kuropatkin issued an order which breathed something of an offensive movement for the morrow. It began "To-morrow the army will continue to hold its position. Its defence will not be restricted to a passive defence, but officers commanding army corps will take the offensive if in their judgment such a course is possible."

So far so good; in the afternoon of the 31st the general officer commanding 31st Russian Division saw his chance, and asked leave of his corps commander to assume the offensive. Meanwhile his corps commander had received from Kuropatkin a tentative retreat order! Not caring to assume the responsibility of an offensive in the face of an order by which he might be called on to retreat at any moment

* The line was Shou-Shan-Pu—Meng-chia-fang—Hsia-pu-thence north of the Tai-tzu to Manjuyama. It is often described as the "Advanced Position."

the army corps commander passed on his divisional commander's request to the commander-in-chief. The answer came back vetoing the suggestion. There could not be a better example of the error of issuing detailed orders to meet a situation which has not yet arisen. It is perfectly correct for the staff of an army to have orders ready for a situation they think may arise, such as a retreat, but to send out those orders before the situation does arise is fatal.

Kuropatkin's intention now was to withdraw into the line of forts round Liao-Yang, and transfer the bulk of his army across the river to oppose General Kuroki. The withdrawal was to begin on the night of the 31st, but the attack on Kuroki was not to take place till the 3rd September. Before the 3rd September came, much had taken place. On the 2nd September a counter-attack was directed against Kuroki, but it was made by only 5½ battalions although there was the greater part of four corps at hand. At 3 A.M. on the 3rd September, the situation was such that Kuropatkin had to choose between accepting defeat or making a last bid for victory. He accepted defeat.

From a study of this battle of Liao-Yang, it would appear that Kuropatkin failed to take the direction of the battle into his own hands. A case in point is when he left it to the judgment of his corps commanders to attack or not, thereby making a subordinate responsible for a decision which is the prerogative of the commander-in-chief. The absence of concerted action among the Russian commanders was very noticeable, and may be directly traced to the want of a plan in the mind of the commander-in-chief. The latter exerted no influence on the fight. He merely supplied the demands of his subordinates for munitions, and reinforcements, which were sent here and there in dribbles.

This same incapacity to take hold of his subordinates, and exercise the command entrusted to him, was manifest in Bazaine in 1870. The reason, at bottom, was that there was no plan. The consequence was, that there was ignorance among the subordinate leaders of any definite intention, and that the rank and file felt the indecision of those immediately in touch with them.

The other side of this picture is shown in the same battle of Liao-Yang in the action of the Japanese. The one idea of Oyama and his subordinate commanders was a vigorous offensive. They depended everywhere on the vigour of their attacks. Nothing was better proof of the excellent *moral* of the Japanese than the energy of their secondary attacks, to which this principle applies particularly. In such cases, owing to the comparative weakness of the troops employed, only a minimum reserve can be afforded. Consequently, the attack must make up in vigour what it lacks in strength. Whether Kuroki was or was not intended to carry out the task which confronted his relatively weak detachment, does not concern us. The fact remains that he knew Oyama meant to bring about a decisive result if he could. His divisional generals knew Kuroki meant driving in an attack on the enemy's flank. Their *origadiers*

understood the intention thoroughly. Consequently when the premature exhaustion of the reserves took the control of the battle out of even the army commander's hands, the divisional and brigade commanders carried out the one plan to its end. Whatever fault there may have been in the initiation and development of the plan, it was atoned for by the admirable offensive spirit of the subordinate leaders. There are few better examples of the value of an offensive spirit pervading a whole army, and it was due to this spirit more than to any brilliant strategy that the Japanese were victorious.

Circumstances usually necessitate one side assuming the defensive, but its commander means merely to defer the offensive, to wait till the enemy has exhausted himself, and then to turn on him. This method is apt to get too much credit given it in peace,—one is apt to forget that the side attacked, in war, would get just as exhausted as the side which attacks. The longer the offensive is deferred, the more exhausted will the defender be, and, in war, the more will his nerves be strained. In peace, nerves are never considered, in war they bulk very large. A defensive attitude can easily degenerate from a temporary to a purely passive defence, unless the spirit of seizing the offensive is imbued by peace-training.

Finally, this spirit must descend to the rank and file from its leaders, and when the reality of war comes, it will be choked, or kept alive, by the influence the leadership exerts, through the manner in which plans are transmitted. Every individual must feel that the battle has been commenced by the deliberate intention of a commander whose one idea is to fight it out to the finish, no matter what may occur.

NOTES ON THE USES AND POSSIBILITIES OF SKI.

BY CAPTAIN C. HORDERN, R.E.

I.

Introductory.

Although ski-running as a sport has, within the past few years, sprung rapidly into popularity in England and Central Europe, it would seem that little or nothing has been written regarding the utility of ski as a means of locomotion. The object of this paper is to give a few data and suggestions regarding the extent to which ski can be put to practical use, as it is thought that their possibilities are—in India at any rate—not adequately realised.

It should be premised that the writer has no Himalayan experience, and that his views as regards ski in the Himalaya are only tentative, though based on some study of the literature of Himalayan exploration.

For much assistance in compiling these notes, the writer's acknowledgments are due to "Ski-Running" (edited by Mr. E. C. Richardson); the works of Sir Martin Conway, Mr. Freshfield, and Dr. and Mrs. Workman; the Badminton Library volume on "Mountaineering"; and the Year-book of the Ski Club of Great Britain.

II.

General Remarks.

(a) A general description of the ski and accessories commonly used is given below as an appendix; it is sufficient here to say that ski (pronounced as the English "*She*") are wooden snow-shoes of a form designed to enable the wearer to glide over snow. Their use makes it possible to traverse with great ease snow-covered ground, the crossing of which without ski would either be impossible or involve very hard work.

(b) Advantage over other snow-shoes.—The power of gliding, i.e., the diminution of friction to a minimum, and especially the consequent ability to profit by the force of gravity when descending, is the feature which distinguishes ski-running from the use of snow-shoes of the type usually known by the latter name. Ski are heavier than snow-shoes, but where weight is a consideration they need not be very much heavier; and their characteristic advantage more than compensates for their additional weight.

(c) Learning to ski.—An active man can become a fair runner, fit to go on ordinary tours with a good leader, after three or four weeks' practice; Indian hillmen would probably take less. The standard English text-book is "Ski-Running" (E. C. Richardson), published by Horace Cox, London.

III.

Snow.

Generally speaking, ski can be advantageously used wherever snow is over 6 inches deep. In deep soft snow a man on ski can travel easily where without them he would sink in up to his waist; this is a matter which any ski-runner knows by every-day experience. Even under worse conditions—such, for instance, as Mr. Whymper found on Chimborazo, where a 12-foot pole sank in and would have continued to descend by its own weight if let go—suitable ski would make it possible to travel without undue difficulty.

UNFAVOURABLE CONDITIONS. (a) *Newly-fallen snow.*—As a rule the temperature is little, if at all, below freezing, and the snow “balls” on the under-side of the ski, rendering it impossible to glide on them; large masses of snow accumulate on the ski, the weight of which makes further progress impossible. This can be got over to some extent by waxing the ski; if so much wax has to be put on that they will not “bite” when going uphill, it may be necessary to use a detachable strip of sealskin on the under-side while climbing.

With newly-fallen snow there is a greatly-increased risk of avalanches, the chief danger to which a ski-runner is exposed. This is referred to below.

(b) *Thaw.*—During a thaw the conditions often tend to make the snow “ball” as above; but wet snow, more especially where thinly-crusted snow is beginning to melt, may afford excellent going.

(c) *Crusted snow.*—It often happens that the surface of the snow is melted by a hot sun during the day, and freezes at night into a crust. If the crust is thin, ski-ing is feasible, but the possibility of running into hard icy patches makes the going uncertain and unpleasant. If the crust is really hard, lack of grip makes steering very difficult, and ski-ing becomes impracticable, except in so far as certain aids to climbing (see Appendix) may help matters uphill. Where occasional steep slopes of snow too hard for ski-ing are likely to be met with, it may pay to carry “crampons” and to cross them on foot.

Crusted snow, as far as can be judged from the writings of Himalayan explorers, is common in the Himalayas; but it seems unlikely that this condition is so frequent or so severe as to outweigh the undoubted value of ski under more ordinary conditions.

On a hard icy road it may be preferable to go on foot, especially uphill and if the road be narrow.

A layer of an inch or two of soft snow on the top of hard cruusted snow generally forms an excellent condition for ski-running.

(d) *Wind-driven snow* at high levels may appear either in patches best described as “cloth-like,” or as “skavler,” in ridges and humps which are very hard and unpleasant; but a way round or across can usually be found.

With the above exceptions, almost any condition of snow is favourable for ski-running, and as a general rule it may be taken that where snow has to be crossed men should go on ski.

IV.

Rate of progress.

(a) *Long distances.*—Dr. Nansen says that under favourable conditions good runners can cover 60 to 70 miles in a day. He refers to Norwegian runners, and probably to undulating open country such as he found in Greenland. In mountainous country the distance covered in a day by average runners after a few weeks' training would probably not be more than 30 to 40 miles: while soldiers or heavily laden men would not keep up more than 20 to 25 miles a day for any length of time.

"In 1900, a detachment of the Norwegian Guards accomplished a march of 125 miles in seven and a half days, an average of some seventeen and a half miles a day, which must be looked upon as a very good performance, considering that they carried canvas wherewith to improvise tents, sleeping bags, and provisions, and moved up hill and down dale, once ascending to a height of 4,000 feet above sea-level. It will thus be seen that, in marching trim, soldiers on ski do not travel faster, or to any great extent faster, than infantry at other times; the only advantage of the ski being that, when the snow lies, they are able to move about, and get along in parts where men not provided with such appliances or snow-shoes would be compelled to remain idle."

(from "*Ski-Running*," E. C. Richardson.)

(b) *Short distances.*—As a rule over a short distance in mountainous country the measure of a journey on ski is better given in vertical height of ascent or descent than in horizontal distance.

Up-hill.—Mr. Richardson gives the rate of progress as "about 25 per cent slower than boots, referring to an ascent where it is necessary to zigzag, by comparison with a similar ascent on hard ground. A normal Alpine rate of ascent being 1,000 feet per hour, Mr. Richardson's rate is equivalent to 750 feet per hour. At high altitudes this would, of course, be much reduced; but in any case, wherever ski can be profitably used, the rate of progress up-hill on ski will certainly be faster than on foot on the same surface.

On the level.—A really good runner should keep up from 7 to 8 miles an hour, and over a short distance should move even faster; but laden men, if ordinary runners, would not keep more than 5 miles an hour at the outside.

Down-hill.—The advantage of ski over any other form of snow-shoe is at once apparent. The ski-runner travels downhill by the force of gravity alone, and his speed may attain over short steep slopes to as much as 30 miles an hour, perhaps more, and indeed approaches (as Nansen says) at times to that of a falling body. In mountainous country the rate of descent, though dependent chiefly on the skill of the runner, is modified by the need of caution, especially on wooded ground or where rocks protrude from the snow. It is almost impossible to give an average rate of speed down-hill, as so much depends on the conditions of ground, snow, and skill of runners.

(c) *Actual figures*.—The following figures are those of various actual performances on ski:—

(1) *Short tour*.—By moderately good runners (English).

Descent to valley ...	290 feet.
Ascent to pass ...	2,700 "
Descent to destination ...	3,100 "

Distance traversed (not reckoning zigzags) $6\frac{1}{2}$ miles.

Time taken (ex-halts) to top of pass 3 hours, descent 1 hour.

Parts of the ascent and descent were in dense wood. It will be noted that the actual climb to the pass, which took about $2\frac{3}{4}$ hours, works out to about 1,000 feet per hour, as against the rate of 750 feet per hour mentioned overleaf.

(2) *Short tour*.—By a similar party.

Ascent to pass ...	2,405 feet.
Descent ...	3,668 "

Distance about $7\frac{1}{4}$ miles, mostly open country.

Total time taken (ex-halts), 4 hours.

In both the above instances the snow was so deep and soft that men on foot could not have accomplished the same journeys without very great exertion and an expenditure of probably at least twice as much time.

The ski-runners carried light loads in rucksacks

(3) *Short descent* by a good English runner, carrying a light rucksack and an 80 foot rope.

Distance ...	$1\frac{1}{2}$ miles.
Drop ...	1,214 feet.
Time taken ...	4 minutes.

This was over a snow-covered glacier; the average time taken by summer mountaineers is said to be $1\frac{1}{2}$ hours.

(4) *Long distance race* in Sweden.—A celebrated instance is recorded in which a Lapp covered 137 miles in 21 hours 22 minutes, or at the rate of nearly $6\frac{1}{2}$ miles per hour. This was chiefly over level country.

V.

Dangers of Ski-running.

The risks to which a ski-runner is exposed may be divided into two classes:—

I. Inherent in the nature of ski.—Apart from external conditions, the only risk in ski-running is the possibility of bodily injury caused by a fall. As snow is usually soft, serious harm hardly ever results; at the same time, since the ski is firmly fastened to the foot, there is an undoubted risk of a twisted knee or ankle, bad enough to prevent a man from using ski for some time. The beginner falls continually, the expert very seldom; and though cases of broken limbs do occur, the risk of injury to a runner who is fit to tour is considerably less than in, say, football or polo.

II. Due to external conditions.—Experience and common-sense will usually be sufficient protection against the risks due to

external conditions of snow and weather. An elementary knowledge of snow-craft is quickly acquired, and beyond this little or nothing is necessary except where, when ski are used as adjuncts to mountaineering, technical mountaineering knowledge becomes the first essential. It is impossible here to go completely into the subject, but the chief risks may be specified.

- (a) First among them is the avalanche. A ski-runner is chiefly concerned with winter avalanches. "By far the commonest form of winter avalanche occurs when a ski-runner crosses (or some other influence disturbs) a long steep slope of *freshly-fallen* snow..... Freshly-fallen snow is accordingly quite the most serious danger of ski-running, and, inasmuch as it usually affords but poor going, it is seldom worth while venturing far on very steep ground after a recent-fall. After a few days of fine weather, however, the snow settles down, the avalanches run off, and what remains becomes firmer and more crystalline in structure."

(*"Ski Running," E. C. Richardson.*)

As regards these and other forms of avalanche, much information may be found in the Badminton Library volume on "Mountaineering," and in "Ski-Running."

- (b) Another danger arises from projecting snow cornices formed by wind along the crests of ridges. A runner ascending from the weather side is liable not to notice that the ridge is corniced, and runs a risk of the cornice breaking away beneath his weight when he gets on to it.
- (c) A glacier under deep snow may be crossed by an experienced party, but it should be remembered that the plight of a ski-runner who falls into a crevasse is more serious than that of a roped mountaineer on foot. The question of roping when on ski is a debated one, and any particular case should probably be decided on its own merits. It is, however, to be presumed that in deep snow crevasses may be so well bridged that ski-runners in winter might travel more easily than mountaineers in summer.
- (d) The risk of frostbite is probably little greater than in mountaineering. Though ski are chiefly used in winter, summer mountaineering is at times carried on under conditions where ski-ing would be impossible. The usual precautions must, of course, be taken.
- (e) Snow blindness is probably more likely in the Himalaya than in other mountain ranges. Its likelihood seems to vary unaccountably in different localities; precautions are hardly ever taken against it when ski-ing in the Alps, whereas in Scandinavia they appear to be very necessary.

All the above are risks which only call for ordinary prudence and are met by methods which—being part of the *technique* of ski-running—are not described in this paper. It may, however, be laid down that they apply at least equally, if not with greater force, to men on foot or on ordinary snow-shoes; and the proper and profitable use of ski, so far from being dangerous, may be taken to be essentially safe.

VI.

Military uses of Ski.

Inasmuch as the use of ski presupposes the existence of snow, it follows that, as far as their military use is concerned, their value is limited. Campaigns carried on in winter are comparatively rare, though the Tibet Mission and the Russo-Japanese War are modern instances; and it is not to be expected that winter conditions will be common. Nevertheless it is the writer's humble opinion that a winter campaign beyond the frontier of India is a contingency which is not so remote as to be negligible; and in any such campaign there would in all probability be opportunities of which ski would enable a commander to take advantage, in a way which without ski would be impossible. It is proposed, therefore, to consider (i) how, and (ii) by whom, ski might profitably be used.

(i) *How used.*—The chief use of ski would be in reconnaissance. Actual fighting could hardly be carried on by men on ski; but the conditions of deep soft snow where ski would be most useful are precisely those under which an advance to the attack would be least favourable and least likely to be undertaken. If however an attack under such conditions were unavoidable, the best use to make of ski would probably be to prepare the way for the attacking force by stamping down the snow beforehand, wherever dead ground or distance from the position made it possible to do so in comparative safety. Even if done at night, this would be a difficult and risky operation; and it is very unlikely that a need for it would arise.

Reconnaissance, on the other hand, would be very much facilitated by using ski. In the first place, the ski-runner moves freely all over the country, where mounted men or infantry would flounder hopelessly and make no progress. The amount of reconnaissance required would probably be greater than under normal conditions, and could only be done effectually by men possessed of great rapidity and ease of movement, a condition fulfilled only by ski-runners.

Again, a scout on ski in hilly country should be able to reach a hill-top well in advance of his main body more quickly than he would on foot, while the speed attainable on ski down-hill would make it possible either to retreat or to send back reports very rapidly. Such scouts if provided with signalling flags should be of very great value.

In the case of an advance along roads under deep snow a few ski-runners with the vanguard would, by stamping down the snow, make the marching easier, and the rate of progress would be much increased.

Despatches would be carried by ski-runners, whether across country or along roads, over long distances considerably faster than by mounted men.

It is often possible, where snow on the roads is not deep enough to impede horses, to use the latter to tow ski-runners (*Ski-Kjöring*) : horses used in this way, having practically no load, go further and faster than if mounted, and the ski-runners remain fresh up to any point where it may become necessary for them to go on alone. This condition, however, applies rather to warfare in Europe than to the Indian frontier, where roads are scarce and bad.

Light sledges (*ski kjaelke*) built up on ski are easily extemporised, and would often be useful in transporting baggage over snow—e.g., the kits of men on outpost duty. Such sledges are used as a matter of course in Norway, where ski-runners are in the habit of touring across country in winter, taking sleeping bags and light kit on *Kjälkes*.

Officers of the Alpine troops in Europe are, as Mr. Freshfield has pointed out, encouraged when going on leave to bring back sketches of little known mountain regions; it should be equally possible in Northern India to get officers, trained as ski-runners, to do the same thing when on ski tours, which would be undertaken just when deep snow would interfere most with other occupations.

As an athletic exercise for keeping troops fit in winter, ski-running could hardly be surpassed.

(ii) *By whom used.*—It is not suggested that all troops should take ski with them on a winter campaign. But in the case of Gurkha regiments especially, and of others recruited from hill tribes, there can be little doubt that the men would quickly become good ski-runners, and would take to ski-running very keenly. Such men, moreover, are those most suited for, and likely to be used in, a winter campaign, more especially for the reconnaissance and similar work in which ski would be most useful.

It would probably be easy and cheap to train, say, a half-company of Gurkhas to use ski; and it is not overstating the case to say that a practical demonstration of what they could do would probably be an ample—and, to the uninitiated, astonishing—confirmation of what has been said above.

It may be pointed out that all the European nations which possess mountain territory have some of their troops trained as ski-runners; and though on the Indian frontier opportunities for the military use of ski may be less frequent than in Europe, it seems extremely probable that, once the possibilities of ski are realised, it will be thought worth while to train a certain number of troops to use them.

VII.

Non-military uses of Ski.

These are fairly apparent from what has already been said. Generally speaking, ski would be used for keeping open communications which would otherwise be closed by snow.

Instances of this may be found all over Europe during the winter. In Scandinavia ski are more used than any other form of locomotion. In Central Europe, where the population has little occasion to go far from home in winter, ski are less commonly used; but here too they are worn as a matter of course, both by the native inhabitants and by visitors, whenever even a short journey on the snow is undertaken. In the dales of Yorkshire ski were known and used many years ago, and their use is spreading fairly rapidly in Scotland and the north of England. Even in Australia, in the mountainous country round Mount Kosciusko, the entire population is on ski during the winter months.

It may be that in Northern India ski are more used than the writer supposes; at all events there seems to be no reason why they should not be used extensively. It is said* that ski have been introduced by the Kashmir Telegraph Department for use on the line from Srinagar to Gilgit, 250 miles long, crossing passes of 12,000 and 13,500 feet; and it is certain that repairs and maintenance required by any telegraph line crossing snow-covered country would be more easily and more quickly effected by linemen on ski than by the same men on foot. In the same way communication by means of ski-runners, using where possible *ski-kjøring* and *ski kjælkes* as described above, might readily be kept up with places which have hitherto been isolated by snow. Thus ski-runners would render practicable communications at present impracticable; and their speed would often be of very great value where it might be important to repair a line, or get a *link* through, as quickly as possible.

It is not, of course, suggested that in very steep and rocky country, where snow does not lie to any depth, ski would be of practical use; nor that ski-runners should venture unprotected into the territory of hostile frontier tribes. Nevertheless it must always be worth while to have ski available for use where snow has to be crossed. It is probable that their use would facilitate at any rate some sections of, say, the route to Chitral; and it is certain that accidents due to avalanche,† might be to a very large extent avoided, even though a whole column could not use ski, by sending on a few skilled ski-runners ahead of the main body to report on the state of the road.

A more specialised use of ski, on which the writer by reason of his lack of experience touches with considerable diffidence, arises in mountaineering, and more especially, perhaps, in mountain exploration. In the Alps—where most good guides are now proficient

* 1907 Year-book, Ski Club of Great Britain.

† Cf. Lowaraí Pass, 1907.

ski-runners—winter mountaineering has of late years been steadily on the increase, and there is no doubt that this has been very largely due to the introduction of ski. As a pastime for dwellers near the Himalaya, however, this calls for no immediate attention; but the use of ski in Himalayan exploration may be worth considering.

An exploring party in Himalaya consists as a rule of four or five Europeans engaged in mapping and mountaineering, with a large train of coolies carrying supplies and equipment, and constituting in a very literal sense their *impedimenta*. Neglecting for a moment the rest of the expedition—Himalayan coolies on ski are unthinkable—the uses of ski to the Europeans of the party would probably be several. In the first place, soft snow, uncrevassed, appears to be met with constantly when moving from one camp to another. Even with the "raquette" form of snow-shoe, a long journey over snow in this state cannot fail to be very exhausting, especially at high altitudes: whereas on ski the labour involved by what Mr. Freshfield has called "high-actioned wading" is altogether absent, while the rate of progress is probably at least doubled. The importance of this on a long march is two-fold: the leaders of the expedition remain fresh, and, being able to push on quickly, the time available for surveying or reconnoitring is largely increased. The possibility of using ski in this way would seem to be confirmed by the published accounts of various explorers, whose illustrations very often show a condition of snow ideal for ski-running just where the labour involved by soft snow is most complained of.*

Again, assuming the expedition encamped at the highest level to which coolies can be persuaded to go, another use for ski arises in the ascent of neighbouring peaks. Apart from the time saved (and a consequently extended radius of action) if ski could be used on the lower levels in an ascent from the camp, their use should often enable the Europeans to push on to a bivouac at a higher level, whence on the following day a peak out of reach of the lower camp might be ascended. Though this would involve carrying the necessaries for a night in the open—a serious matter in the circumstances—yet the added load need not be too great for men on ski, more especially if the alternative were that the ascent, which might be of the greatest importance to the success of the expedition, must be foregone.

A *ski kjaelke* was tried by the Workman expedition in the Mustagh range† without much success: it would probably be better to extemporise one now and again where conditions are favourable than to take one permanently fixed together.

It has been said that coolies on ski are unthinkable; but this is perhaps not the last word on the subject. Mr. Freshfield has said

* Cf. "Round Kangehenjunga," (Freshfield), p. 158, as an example.

† "Ice-bound Heights of the Mustagh" (Workman), pp. 105-106.

that "it is on trained and disciplined Gurkhas that the future progress of Himalayan mountaineering depends." It is his view that the employment, as porters, of Gurkhas trained to use rope and ice-axe, would enable a Himalayan exploring expedition to effect a success unattainable with ordinary coolies. Although, as Mr. Freshfield says, it is not to be expected that the State will train Gurkhas solely for the benefit of mountain explorers, an attempt has been made above to show that ski-training should have its military value; and it seems probable that, even if only a proportion of the porters with an expedition were Gurkhas trained to use ski as well as axe and rope, its leaders would possess a freedom of movement, and a power of detaching themselves from their main body, which should lead to results beyond any so far achieved.

The disadvantages urged against ski on such an expedition would be their weight, unwieldiness, and the exertion of using them at high altitudes. These are more or less mutually interdependent, and the replies to them are, that ski for a mountain exploring expedition would be made specially light and short (and therefore handy); that, as only a small proportion of the party would use ski, their addition to the rest of the equipment—even allowing two pairs per runner—would hardly be felt; and that, wherever conditions are favourable to the use of ski, the labour involved is less than when going on foot.

As regards the use of ski for difficult mountaineering, and their adjuncts (climbing irons, etc.), the writer is not qualified to give an opinion. It is, however, the use of ski on the lines which have been indicated—that is, as giving to the leaders of an expedition greater mobility and a wider range of action than hitherto—which seems to constitute their chief claim to consideration.

Though irrelevant, mention may here be made of photographic surveying, recent developments of which are peculiarly applicable to mountain exploration. The stereoscopic method—which requires only the exposure of two plates to enable a whole section of map, heights included, to be made—considered in its application by means of ski-runners able to travel easily and quickly to outlying points, gives promise of possibilities as yet undreamt of by the explorer mapping a mountain region, and it is to be hoped that future expeditions may show what can be done in this direction.

In conclusion may be quoted the classic words of one Olaus Magnus (1550), familiar to every ski-runner: "There exists no mountain, however high, which by means of cunning by-ways he (the ski-runner) cannot surmount."

Appendix.

Ski.—The type of ski best adapted for general use is known as the Telemark Ski and is usually made of ash. The diagrams on page 427 give the dimensions of a ski suitable for a man of about 6 feet, under ordinary conditions.

The following table (taken from "Ski-Running") gives the usual Norwegian proportions, both in inches and centimetres, for runners of various heights:—

Minimum Breadth of Ski.	Weight of Ski Runner	Length of Ski for a runner whose height is—								
		up to 4'-3"	4'-3" to 5'-0"	5'-0" to 5'-3"	5'-3" to 5'-5"	5'-5" to 5'-7"	5'-7" to 5'-9"	5'-9" to 5'-11"	5'-11" to 6' "	over 6'-1"
2½ inches, or 6-4 centimetres	under 10 stone.	51"	59"	65"	71"	77"	...	...	...	...
		130 cm.	150 cm.	165 cm.	180 cm.	195 cm.	...	...	...	...
2½ inches, or 7 centimetres	10 to 13 stone.	...	...	...	71"	75"	79"	83"	...	...
		...	...	...	180 cm.	190 cm.	201 cm.	211 cm.	...	...
3 inches, or 7-6 centimetres	over 13 stone.	...	...	...	...	...	79"	83"	87"	91"
		...	...	...	...	...	201 cm.	211 cm.	221 cm.	231 cm.

The stock lengths of ski made by a leading Norwegian maker are 189, 196, 204, 208, 212, 216, 220, 228, 236 centimetres. A rough rule is that the length of the ski should be as high as the runner can reach above his head, though for special purposes ski are often made much longer than any of the dimensions given above.

Ski intended for use on very steep ground, for instance when taken as aids to mountaineering, should be from 6 to 12 inches shorter than the above dimensions, both for lightness and for ease of control. Such ski should have no groove on the underside; the reason for this is that the absence of groove facilitates rapid turning and control generally.

Binding.—Two typical bindings for attaching the ski to the runner's foot are shown in the figures on page 423, which are self-explanatory. There are many other varieties, and the choice of binding is not a matter of the first importance. The only essential is that the foot should be firmly attached to the ski at the toe, while free to rise vertically at the heel.

Probably the Lapp binding would be the simplest and cheapest to use for soldiers; the Ellefsen, on the other hand, when once the toe-piece is hammered to fit the runner's boot, is an excellent binding which it would be hard to improve on.

It will be noticed that a ski-runner's boot should have a small strap and buckle sewn on at the heel, to prevent the binding from slipping off.

Stick.—On ordinary tours most ski-runners carry a pair of light sticks similar to that shown on page 427. These are of great assistance in going uphill or along the level. The disc at the bottom is of interlaced wickerwork hung loosely to the stick, which is thus prevented from sinking too deeply into the snow. A leather loop is usually provided for the runner's wrist.

On steep mountainous ground it may often be better to carry only one strong stick with no disc, which can if necessary be driven deep into the snow as a support.

Aids to climbing.—The three bottom figures show the arrangement of the Sohm-Madlener detachable seal-skin and climbing irons, which may be used either separately or together. These are attached to the ski by means of bolts and wing-nuts at the points A and B in the figures, the strap being brought up and made fast on the upper side of the ski.

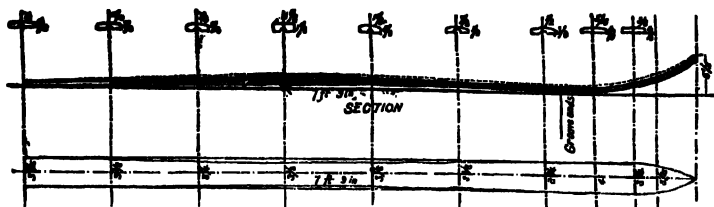
A strip of skin on the underside of the ski, with the hairs pointing backwards, very much facilitates stiff climbing, and should certainly be available for mountaineering work. The climbing irons are only intended for use under difficult conditions of hard steep snow, and are unnecessary except as aids to mountaineering.

As aids to climbing, it may sometimes be worth while on ordinary tours to tie a piece of rope to the underside of the ski; or the ski may be lapped round with thick string at the points A and B in the figures; or the end of the ski may be dipped in water, so as to form an adherent lump of ice. Either of these methods gives a good grip of the snow when going uphill; but it is as a rule pleasanter and less laborious, where possible, to dispense with such aids, taking a zigzag course not steep enough to prevent the runner from using his ski in the normal gliding method.

Other accessories.—A rucksack is the best means of carrying spare clothing and food. On tour, at least one member of the party should carry map and compass. As a ski is occasionally broken when on tour, it is a good plan to carry a metal tip which can be fastened to the broken ski, so as to enable it to glide well enough to carry the runner to his destination. A ski-runner should always carry a strong knife, and possess the means of extemporising repairs to a broken strap, etc.

A variety of hints on equipment and clothing, as well the whole of the technique of ski-running will be found in "Ski-Running," a standard work which goes most completely into everything connected with the use of ski.

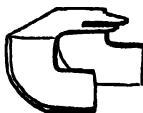
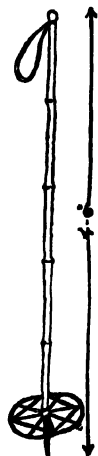
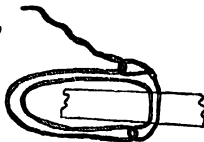
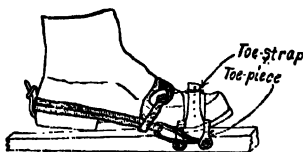
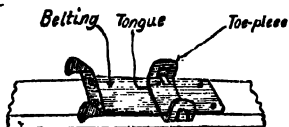
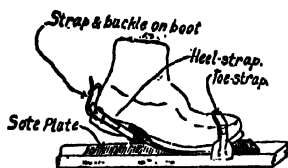
Much valuable information is also to be found in the Badminton Library volume on "Mountaineering", and a "Report on the Equipment of Mountaineers," published for the Alpine Club by Messrs. Spottiswoode and Co., London.



Plan.

Ski suitable for a man about 6 feet.

(from the Year-Book of the Ski Club of Great Britain.)



6TH (POONA) DIVISION PRIZE ESSAY.

BY CAPTAIN C. J. DEVERELL, WEST YORKSHIRE REGIMENT.

SUBJECT:

"The transition from the defensive to the offensive is one of the most delicate operations in war."—*Napoleon.*

"If victory is to be won, the defensive attitude must be assumed only in order to await or create a favourable opportunity for decisive offensive action."—*Field Service Regs., Part. I.*

Discuss this question of the change from the defensive to the offensive, on which our Regulations lay such stress, and which Napoleon described as so difficult, with special reference to the recent wars in South Africa and Manchuria, quoting instances of such operations and pointing out how far success or failure resulted, with your opinion as to the reasons of such success or failure.

I.

At first sight it would appear that the two quotations which form the subject of this essay, deal with different conditions. Napoleon's well-known maxim was surely intended to refer to the whole strategy of a campaign; the quotation from our Field Service Regulation refers to the battle which should be the object at which the strategical plan aims. Yet underlying both is the principle that the offensive is the more desirable form of war, and that any assumption of the defensive should only be adopted with a view to creating a favourable opportunity for decisive offensive action. The latter, however, is by no means easy of accomplishment, and is only to be undertaken when the offensive course is not possible.

The division of the subject.

It will now be our task to consider—

- (1) whether the teachings of history confirm this use of the offensive upon which our Regulations lay such stress;
- (2) wherein lies the weakness of the transition form of war;
- (3) the lessons of the wars in South Africa and Manchuria with regard to the conclusions formed in (1) and (2).

II.

It is generally agreed that the principles of grand tactics have not altered in the least. Great soldiers, either by stress of war or by study of military history, have shown us, from time to time, a new method of study of an old principle.

The effect of modern improvements upon grand tactics.

If we consider for a while the experiences of the great leaders whom Napoleon has told us that we must study, we shall find that the adoption of any alteration in manœuvre or formation has always been to give either increased power or increased mobility. As this increased power or increased mobility has made itself felt, the difficulties of any transition from the defensive to the offensive has correspondingly increased.

From 1346—1415 the English gained many victories; their tactics were simple and consisted in taking up a position where the enemy was forced to attack them; and then, discharging great flights of arrows from their superior weapon (the longbow against the cross-bow), they would charge home with masses of cavalry against their disorganized enemy. But armies in those days could not be called mobile when their warriors were clad in heavy personal defensive

Cromwell.

armour. Cromwell, who stands as a remarkable instance of a great General who had had neither experience in war nor practise in command, soon found that the secret of success lay not in awaiting the attack of the Cavaliers, but in training his cavalry to charge home, riding knee to knee.

The Great Frederick revolutionised warfare by his oblique order of battle, by which he sought to place

Frederick the Great.

himself obliquely on the flank of his opponent, and then to complete his victory by rapid firing and repeated bayonet charges. In Article XXIV of his Instructions to his Generals Frederick says that "to act on the offensive requires good brains, and good generals who have courage."

Napoleon saw that the secret of success in battle was to concentrate superior strength, moral, physical, or

Napoleon.

both, at the decisive point. To obtain fuller advantage Napoleon studied the ground, and then, as Napier says, "his battle was the swell and dash of a mighty wave before which the barrier yielded and the roaring flood poured onwards, covering all."

It may be argued that Wellington fought defensive battles, and won many victories, but it cannot be said

Wellington.

that he ever delivered any very crushing defeat to his opponents in his defensive battles. Waterloo is no exception, because the telling victory was achieved by the timely arrival of the Prussians. Nevertheless, Wellington, in common with all really great generals, did not enter upon a campaign with the idea of awaiting an attack in a strong position; no student of the life of this great English soldier could imagine for one moment that he was imbued with such a false conception of the first principles of war. It was his misfortune that his inferior numbers and his defective organization forced him to a course of conduct which must have been entirely opposed to his temperament, inclined by nature as it was to quick and energetic action. He was victorious, but his troops were morally and physically exhausted by hard fighting; his losses were heavy, and his men often spent the night of victory in plunder, and thus allowed the opportunity of pursuit to slip away.

Time and space does not permit us here to enter more fully in to the doings of great leaders, but a study of their experiences can only further convince us that decisive results are most probable from the offensive form of war. The commander, who feels himself sufficiently strong to attack, does so with the object of achieving a greater end; it is true he runs greater risks, but "Nothing venture, nothing win." In war we have to make the best practical use of the means at our disposal, but it is a mistake to undertake war unless we are in a position to gain our object before the enemy has an opportunity of restoring the balance. The enemy must then be brought to battle as soon as possible.

The increase in the frontage upon which armies are now deployed has necessitated the battle being fought on a preconceived plan, and being led up to from the initial strategical deployment; for if the commander waits to make his disposition on the battlefield, his chance for striking a decisive blow will have vanished before the troops can be brought to the desired spot. The liberty of a modern commander is thus restricted, but the advantage becomes even more pronounced for the general who possesses the initiative.

III.

Having formed the opinion that the experience of great leaders favours the offensive, it is somewhat disconcerting to find that the theoretic value of the defensive is extolled by Clausewitz:—"The defensive is the stronger form with a negative object; the attack is the weaker form with the positive object." But how far removed this great writer was from advocating a passive defence we find in Chapter V of the same book. "A swift and vigorous assumption of the offensive—the flashing sword of vengeance—is the most brilliant point in the defensive; he who does not from the first include this transition in his idea of the defensive will never understand the superiority of the defensive as a form of war." Again he says that if the defensive is the stronger form of war with a negative object, then it must only be employed as long as weakness compels its adoption.

A study of Clausewitz's writings on this point leads one to suppose that he was convinced of the superiority of his defensive, (that is to say of the defensive, with the counter-attack), over the offensive. At the same time it must be remembered that Clausewitz discusses the question theoretically, laying great stress on the advantages of ground, surprise, and attack from different directions. He includes the moral qualities of his troops, and "success in war depends more on moral than on physical qualities." Clausewitz argues that the defender has all the advantages of the second hand, he can see the lead and can cap it if the cards are in his hand. This may be true of cards, but, as General Von Cæmmerer points out, does it hold good in a game of chess,—does not the initiative then confer such

great advantages that often the second player is so occupied with the defence that he has no time to initiate his attack ?

It is certain that the Germans of to-day are by no means in favour of the defensive battle. They rightly consider that all the advantages accruing from the defensive rôle are more than counteracted by moral considerations. General Von der Goltz says in *The Nation in Arms* that "the idea of the greater strength of the defence is, in spite of all, only a delusion, for to make war means attacking."

"To push forward," writes Major Balck of the German Great General Staff, "stirs up men's hearts and galvanises their resolution. The conviction of superior strength, whether it is well founded or not, never fails to act on the assailant to the detriment of his adversary." How thoroughly the Germans appreciated the value of the offensive a study of their war with France in 1870 will quickly show. Yet we see that Von Moltke made

Von Moltke in 1870. every arrangement should the French secure the initiative and adopt the offensive ; he was prepared to follow the only sound course that can be adopted by an army which has, by its opponent's more able manœuvring or superior mobilization, been thrown on the defensive, *viz.*, to attack before the enemy has had time to complete his arrangements.

No general, however, is always in a position to attack, and the case of a weaker army opposed to a stronger must be considered. Under such conditions, the general officer commanding seeks, by means of entrenchments, to equalise the opposing forces by containing, with a relatively small detachment, so large a number of his opponent's troops that sufficient men remain available to attack with some hope of success. But in every circumstance he who hesitates too long is lost, and if the defender waits until the assailant has fully developed his attack, the defender's reserves are more likely to be absorbed in reinforcing portions of his own line than in counter-attack.

Time is usually with the assailant, and it is rare that in practice a great counter-attack is successfully made on an exhausted enemy. In fact Austerlitz and Salamanca are models to be followed by defenders, but the former possesses the disadvantage that the defender is committed to a certain line of action before the opponent's intentions are fully disclosed. Thus even in the days of

Types of defensive battles.

Napoleon, the defender was adopting that preconceived plan of battle which we have already decided to be to the advantage of the holder of the initiative. How greatly that advantage has increased under more modern conditions the next chapter (dealing with the two wars of the present century) is intended to show.

IV.

Having discussed in a general manner the lessons of past history, and having satisfied ourselves that each development in

tactics has led to increased mobility and increased power, and that experience has generally shown that these developments are on the side of the offensive, it now remains for us to consider the subject of this essay in the light of the last two important wars.

The South African War was typical of the difficulties that arise from the possession of a world wide empire and a limited exchequer, when the weaker force in the actual theatre of war, impelled by imperative political considerations, refuses to abandon the frontier, and attempts to hold it with the whole or part of its forces. The strategy of the period preceding the campaign was, in its inception, defensive in character, this course being necessary to eliminate any possible idea that the war was of Britain's seeking. Until the necessary reinforcements arrived from England the British generals were compelled to adopt a defensive attitude. When these reinforcements arrived it became necessary to undertake what Napoleon has described as one of the most delicate operations in war. But in carrying out this operation the British were assisted by the failure or inability of the Boers to grasp the value of the offensive. Contenting themselves with locking up our isolated garrisons, they then came to a standstill, and allowed Lord Roberts to carry out his plans for the assumption of the offensive almost without interruption. Neither had they the training and discipline so necessary to carry out a vigorous offensive, nor were they inspired with that moral superiority and patriotic fervour which was to distinguish a smaller nation in a contest with a larger and powerful adversary some two years later. Tactically the Boers were quite content to repulse our attacks on their carefully chosen positions, and never attempted a counter-attack on any large scale.

It must be confessed, however, that we too suffered from an exaggerated idea of the importance of the strength of entrenched positions, and a general feeling seemed to pervade the army that entrenched positions could only be taken by sap. The result was our half-hearted measures on the Tugela, when the capture of one position was regarded only as a fresh parallel and not as an opportunity for further immediate offensive action. Spion Kop was captured by night, but, content with the capture of it, we assumed a defensive attitude with the object of again assuming the offensive later. The opportunity never came, for under the vigorous counterstroke of the enemy the attack collapsed, and the position was abandoned.

The war in South Africa cannot be considered a typical illustration of the difficulties of transition from the defensive to the offensive. A war which is waged between a regular army, organized and highly disciplined, and an irregular army without organization, must be, to a certain extent, an abnormal war when contrasted with a war between two highly organized armies. It is for the latter form of war that we must educate our soldiers, just as a polo or a football team is trained not merely to defeat any local opponent that it may meet in its own station, but to compete successfully with opponents in an open tournament.

But the South African War deals in a very marked manner with the second quotation forming the subject of this essay. There is no doubt that after this war the fatal tactical error of positions was gaining too great a hold over our minds, and it is the object of our present Field Service Regulations to show that the occupation of a position must be assumed only to create a favourable opportunity for counter-attacks. It is presumably intended to encourage the bold soldier, and to give him moral support, so that even if his operations do not meet with success, he can face the critical public and press, who are only too ready to cry out, confident that he has followed those principles which "are to be regarded by all ranks as authoritative."

We will now consider the latest of great campaigns. Japanese strategy and Japanese tactics were made in Germany, and the Japanese entered into the war thoroughly imbued with those offensive principles which the Germans employed with such success in France in 1870. The Russians, on the other hand, have always been more addicted to the defence than to the attack, and they were commanded in their war by a general who was compelled to conduct the war in a manner not in accordance with his own views. Kuropatkin wished to retire to Harbin, drawing his enemy after him, and then, when completely prepared, to abandon his defensive attitude and deal his enemy a crushing blow. We cannot now say whether the transition would have met with success, but it was a plan which cannot be lightly disregarded. Compelled to adopt a more forward line of action we are told that the main idea of all the Russian tactics was to occupy a strong position, to allow the enemy to attack this until he became exhausted, and then to launch a counter-attack upon him and roll him up. In reality what do we find? Zasluch at the Yalu falling between two stools, a defensive battle and a rear guard action; Foch at Nanshan fighting a purely defensive fight, relying on the strength of a position without an attempt at a counter-attack; and Stackelberg, sent down in a half-hearted manner, standing to meet his enemy in a defensive position at Tolissu—his attempt by a night movement to assume the offensive on the second day of the battle ending in a signal failure. At Liao-Yang, Kuropatkin, standing on the defensive with his numerically superior army, was offered the chance of a great success. Riding over the battlefield, and picturing the positions of the rival armies as they are now known to us, we cannot fail to realise that, theoretically at least, an offensive movement on a large scale on the 31st August must have proved successful to the Russians, no matter in what direction it was made. The Japanese soldiers had hurled themselves against strong positions with a heroism that could not be surpassed, yet they were unable to break through the stolid resistance of the Russians. But these very failures to carry the positions resulted in the ultimate success of Japan, for the Russians were held to their positions, and, subjected to assaults by night and day, they became exhausted, and were incapable of offensive efforts even when the attack had ceased

for a time. The Russian Commander-in-Chief then became so absorbed with the Japanese enveloping movement against his left flank, that even had his troops been in a condition to assume the offensive, he himself was in no mood to order it.

The Russians retired in good order after Liao-Yang, whilst the Japanese, who had been in great straits in this battle, remained resting around the captured city. At the beginning of October Kuropatkin felt himself strong enough to commence an offensive movement. Dividing his army into two detachments, the Russian Commander-in-Chief intended to envelop the Japanese right with his eastern detachment, while the western detachment marched against their centre. Instead, however, of a sustained and vigorous offensive against the Japanese centre, Kuropatkin's orders disclose his fondness for defensive positions, and the initiative of his commanders was restricted from the very commencement. Very different were the orders issued by Oyama, that he intended to attack the enemy before he was completely deployed, with his whole strength. The Japanese dispositions at the commencement of their battle on the Sha-Ho show great boldness in trusting to the defensive power of the wings, whilst the main forces were kept concentrated in the centre, ready to act when the enemy had definitely committed themselves. Attack was then rightly met by counter-attack, with the result that Kuropatkin's irresolution was imposed upon. The superior training and organization of the Japanese army triumphed, but the previous experiences of the Russians had not been such as to fill them with encouragement; there was no true co-operation in their army, no guiding hand; with the result that when the Japanese counter-attack began to develop, the offensive movement at once came to a standstill. Yet the Japanese are not quite satisfied with this battle. Circumstances forced them to a defensive attitude after Liao-Yang, and when surprised by the Russian attack they rightly assumed the offensive. It is, however, conceivable that had the Japanese been able to assume the offensive in their own time, the battle on the Sha-Ho might have assumed a very different aspect and have been more productive of great results.

Before the battle of Mukden the Russians had decided to take the offensive, but the Japanese, declining to be caught a second time, forestalled their opponents. In the battle that followed, Kuropatkin has been severely criticised for not keeping a large reserve under his own hand, but it must be remembered that he was preparing to advance with his right wing, and that he had not disposed his troops to fight a defensive battle on a large scale. At the beginning of the battle the Russians were surprised, and at once lost the initiative, and for the rest of the struggle they were only able to follow the lead of the Japanese and to conform to their movements.

A careful study of this battle causes us to consider the apparent weakness of the Russian attempts at counter-attack. Twice to the north of Mukden they were made with overwhelming numbers, and and at no unfavourable moment, yet they never gained anything but

a temporary success, and led to nothing decisive. It is easy to be wise after the event, and to see now what Kuropatkin should have done, but it must be remembered that the Japanese were deployed on a front of 100 miles, and Kuropatkin did not know on which flank the decisive attack was to be made. Indeed he was deceived into the belief that it was his left flank which was to be attacked, and early in the battle despatched a whole army corps from the general reserve to meet this threatened envelopment. Hence it seems that the difficulties of bringing off a big counter-attack, such as Wellington was able to do at Salamanca, have greatly increased in these days of large armies deployed on wide fronts.

The difficulties attendant on such a course cannot be better demonstrated than by a study of the plan which General Von Caemmerer puts forward as suitable for the Russians prior to this battle. In this plan, which the author claims to be equally suitable for offensive or defensive action, about one-third of the total force was to be placed as a main reserve 20 miles to one flank of a line which already stretched for 50 miles away from his further flank. In this case it is not to be denied that the reserve was to be placed on the flank best suited for decisive offensive action, but at the same time it was far distant from the flank upon which Kuropatkin in his preconceived idea of the battle expected to be decisively attacked. It is, however, the bold plan which succeeds in war, and we know that the Japanese preferred any risk to being thrown on the defensive. If the Japanese were ever threatened with an attack they at once took the initiative, and went out to meet the enemy. They did not hurry reserves off to the threatened point, but a counter-blow was struck at the enemy at his tenderest point elsewhere. The Russians, on the contrary, always attempted to parry the blow, by sending more troops to the threatened spot. Thus their strength was gradually frittered away, and they never had their full strength concentrated at the decisive point for a counter-attack. Hence the belief is forced upon us that in the big battles of to-day, the side standing on the offensive or the defensive must fight on a preconceived plan. The mind must be made up beforehand as to how the action is going to be fought, and the troops must be disposed beforehand to suit the plan. The offensive therefore must more than ever be favoured, as it is easier to preserve a plan if we have the initiative and can pursue a vigorous course of action.

Apart from this failure to grasp the methods most likely to lead to success, why did the Russians fail to bring off their counter-attacks? Their failure may be attributed to three great causes:—(1) want of training, (2) want of organization, (3) want of leading. The infantry throughout the war were slow and clumsy. They fought in dense formation, and were more accustomed to fighting behind trenches than in the open. There was little or no co-operation amongst the generals, or amongst the different bodies of troops. Half-heartedness characterised their efforts, and we know that half-hearted measures can never bring success.

V.

Before concluding* this essay, there is one form of war which has hitherto not been mentioned, but which **Siege operations.** calls for a few remarks, that is siege warfare.

In the siege of Port Arthur the Russian fatal genius for passivity was well maintained; the repeated repulses of the Japanese were never turned to full account by energetic counter-attacks. Hence the Japanese were left at liberty to choose their own time and place for assault.

It would appear that the Japanese always expected that a big offensive movement from Port Arthur might be made, and this fear probably had no small influence on their methods of investment. The railway formed their one line of supply, and any movement from the fortress against their railway line might have had very serious consequences to the besiegers. It was in part the danger of any interruption to their communications which prevented the Japanese from making their main attacks against either the eastern or western defences.

The difficulty of inducing men committed to the defensive to leave their fortifications is an ever increasing danger in modern war.

It is hoped that enough has now been said to show that the **Concluding remarks.** offensive is, and always has been, the most preferable form of war. The size of modern armies, and the freedom of communication conferred by the many improvements to land and water transit, is on the side of the leader who can take the initiative, and handicaps him who, by force of circumstances or by inferior ability, assumes the defensive rôle in the hope of a transition to the offensive.

It must be remembered that in Manchuria this freedom of communication was limited, for there were no roads, and both armies were dependent on a single line of railway. Very different will be the case of wars in countries intersected with the network of railways which is to be found in Europe. Time more than ever will be with the attacker, and it will be rare to find a successful issue attend the defensive policy. Then those words will be found very true which Marshal Oyama is reported to have used before the battle on the Sha-Ho, "One ought never to allow oneself to be forced into the defensive even by superior forces."

Offensive action must be prepared for in peace time; the nation that fails to do this cannot hope to wage successful war.

THE REVOLVER AS A CAVALRY WEAPON.

BY MAJOR MOLYNEUX, D.S.O., 12TH CAVALRY.

It may be safely asserted that the revolver is not much in favour with cavalry officers; and it is unfortunately true that their distrust is only too well founded. The reason is not far to seek: real proficiency with any firearm is impossible without the expenditure of a good deal of time, money, and ingenuity, and the revolver has been, and still is, the most neglected of our firearms, never having received a tithe of the attention lavished upon the rifle by the cavalry and infantry, or upon their own weapons by the artillery.

I have often heard cavalry officers assert that the revolver is almost valueless for mounted use; and the annual exhibition by gun-shy horses and untrained shots only tends to confirm them in that belief.

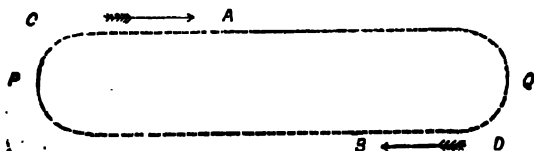
On the other hand, few will be found to deny the value of the revolver in the hands of a "Buffalo Bill" who can make a practical certainty of hitting his man, at a dozen yards distance, when riding at any pace.

It is the purpose of this article to show how easily this proficiency can be obtained, by those who are armed with the revolver and consequently bound in duty to obtain at least an adequate degree of skill in its use, if only a fraction of the attention be given to the subject which we give, as a matter of course, to the attainment of proficiency in hitting moving objects with the rifle.

The horse must first be made absolutely reliable, by the use of blank cartridge fired from his back until he takes no notice of it. A convenient method of determining whether the horses are sufficiently steady is to make those armed with revolvers advance in single file, on their way back from parade, firing blank from their revolvers as they advance. It is easy, from the front, to see whether any horse swerves from the covering alignment. If he does, he should be ordered extra practice. Australian horses require very little of this training, Indian country-breds are more troublesome.

The best training for the man is the mounted duel. This is far more interesting, as well as far more useful, than any kind of target practice. It can be carried out in perfect safety by the use of the wax bullets used by the French duelling clubs, provided that proper precautions are used; and the expense is very small, compared with the results obtained. 1,000 shots can be fired for about 55 francs, or 34 rupees. The methods of practice which I have found best are the following:—

- (1) Mark out a track, as under, with a broad line of chalk or tape:



The track to be about 100 yards long by 12 yards broad. The combatants start from C and D respectively; on passing one another

at A and B, they fire at one another at 12 yards distance, continuing to move round the oval track, and firing each time they pass one another.

(2) Using the above track, one combatant fires mounted at the other dismounted; the latter being stationary at A or B.

In both the above practices, the superintending officers station themselves at P and Q, where they can examine the coats, etc., of the combatants at the finish. Hits on the man alone count: hits on the horse count neither for nor against. Regulation revolvers only.

The following precautions are necessary in the case of each combatant, when firing at so close a range as 12 yards:—

- (a) A special mask, with plate-glass front, on the head. This has also protection for the neck.
- (b) A small metal shield on the revolver, to protect the right hand.
- (c) A leather glove on the left hand.
- (d) A soft goatskin coat, covered with whitewash, reaching to the knees, split up behind.
- (e) A blanket all over the horse, tied with tapo behind his quarters and round his neck; and cheap blinkers.

At first, very few hits will be registered, even at a walk. The improvement, however, is extraordinarily rapid, and the canter will soon be found no more difficult for aiming than the walk.

A list of requisites for this training, with prices, is given in tabulated form below:—

	francs.
2 special marks, with plate-glass front, at 20	40.0
1,000 wax bullets	40.0
1,000 caps (appareil d' amorçage)	14.25
6 false cartridges	18.0
2 hand shields (for pistol hand)	8.0
1 uncapping block (appareil pour desamorçer)	2.0

Total ... fr. 122.25 or Rs. 80.

All the above may be had from Messrs. Lepage Frères (Piot-Lepage), 12 Rue Martel, 10 ième Arrondissement, Paris.

The following can be procured locally:—

One pair soft goatskin coats, to be whitewashed so as to show the splash of the black wax bullet; cost about 6 rupees each.

Blinkers.

18 false cartridges, to be copied by any mistri, in brass or iron, from the French pattern.

One pair of false sights to go just over backsight, as wax bullets tend to shoot a little low.

The total cost will thus be seen to be under Rs. 100 (initial). Rs. 70 per annum, expended annually on the 2,000 caps and bullets per regiment which should be ample, with care and supervision, to secure a high degree of skill, is the only recurring expense. It would not seem that the result obtained is dear at the price. £6 10s. for initial expenditure, and £5 per annum recurring, will cover everything. No powder is required, for the cap alone propels the bullets

REGIMENTAL ASSISTANCE IN THE PROBLEM OF FOOD-SUPPLY IN WAR.

BY CAPTAIN E. G. HART, S. AND T. CORPS.

The importance of the supply of food in war scarcely needs insisting on here, as it is brought to the notice of every reader of military history and strategy on almost every other page. Colonel Maude in his "Evolution of Modern Strategy" remarks: "It is almost a commonplace in modern continental works dealing with the conduct of the monster armies of the day, and particularly in German ones, to find the food-supply of the men treated as the limiting condition—indeed, the almost insuperable one." The author goes on to state, however, that he does not share this opinion, owing to the improvements which have taken place in the preservation and compression of food, and to the enormously improved means of distribution and communication. He tells how he has seen, and practically lived on, rations of mixed meat and vegetables, of which eight days supply weighs only one pound. These remarks are interesting as showing the great importance of the food-supply question, and also the ignorance on the subject which obtains even amongst our best authorities on military matters, for, as the writer will try to show later on, it is absolutely impossible to live on two ounces of any food, much less compressed meat and vegetables, per day.

The supply of food in war is almost generally regarded as a question which is the exclusive concern of staff and commissariat officers, and one not to be meddled with at all by the regimental officer beyond seeing that the supply comes up in quantity and quality to the standard laid down. It is, however, a matter in which the regimental officer can help to an enormous and, hitherto, perhaps unrealised extent, by teaching his men how to obtain the fullest benefit from the rations served out.

The problem of the supply of food in war is briefly this:—To see that each soldier shall obtain sufficient food of sufficiently good quality to keep him thoroughly fit during the course of the campaign. Up to date, the manner of solving the problem has been the eminently practical one of experiment in the field, until we have arrived at what is known as the standard ration. Whilst there is a good deal of truth in the old adage, that "Practice makes perfect," yet there are few who will deny that Practice plus Theory usually gives better results than Practice or Theory alone. The two must work hand-in-hand, neither outbalancing the other, but each considering and duly weighing the results obtained by the other, and thereby correcting and altering its own. Since our experiments so far have proceeded by practice alone, it is worth while turning aside for a few minutes to see what Theory has to say on the subject.

During the past century diet has occupied the attention of many leading scientists, and a number of interesting experiments have been carried out. Foods have been analysed, and their constituents have been separated into different classes, each of which is found to have separate and distinct duties in connection with the nourishment of the body. One class is found to build up bone and flesh, and muscle and blood; another supplies the necessary heat for the body; a third is in charge of cleansing and purifying duties, and so on. These results have been very carefully collected and arranged in a small hand-book by Mr. Eustace Miles, M.A., called "*What foods feed us*," in which he presents a very impartial view of the various leading opinions on the subject. From this book we learn that the constituents of all foods may be divided into the following five classes, each of which has its own special duties, viz.—

PROTEIDS.

STIMULANTS.

FUELS.

WASTE.

SALTS.

Of these classes, the proteids are by far the most important, for it is the one absolutely necessary constituent in any diet. "Unless we have proteid we die," says Professor Gamgee, a leading authority; and Hutchison, another great authority, writes, "Proteids alone are able to fulfil both the functions of a food" (i.e., to form tissue and to supply energy). It is true that a certain amount of salts are also necessary for cleansing purposes, but proteids can take the place of all the other constituents. Proteid builds up the skin, flesh, blood, fat, bones, muscles, and tendons, and supplies the digestive juices. It also supplies energy, and can do the work of the fuels if required.

The fuels are fats, oils, sugars, and starches (or carbohydrates). These give fat, heat, and energy to the body, and spare the proteids. Fats and oils are slow-burning fuels as it were, starches medium, and sugars quick. The description of fuel required depends entirely on the individual and the work he is doing, just as different kinds of engines require different kinds of fuels.

Salts come next to proteids in importance. They act as cleansers and purifiers of the blood, being tonics and antidotes to poisons. Salts are found to a greater or less degree in all foods, but, through ignorance on the subject, are far too often neglected or wasted. The absence of sufficient salts in a diet leads to scurvy and similar diseases. The salts appear to be potashes, alkaline phosphates, lime, iron, and sodas, and it seems fairly well established now that these cannot be assimilated by the body when presented in a mineral form, i.e., they must be actually contained in, and forming integral parts of, vegetable and animal foods.

Stimulants are only necessary as appetisers, and help to excite the flow of the digestive juices. They are not necessary, and if they can be dispensed with, so much the better. They often have a part to play however, in rendering otherwise unpalatable food fit for consumption, and for supplying energy at a pinch. Their effects, on

the whole, are harmful, and although temporary benefits are often obtained through their use, they have to be paid for with interest in the long run. Meat, fish, coffee, tea, cocoa, alcohol, and other foods and drinks all contain these stimulants and appetisers to a greater or less degree.

In the waste class are all fibres, water, and other elements which do not in any way nourish the body, or perform any duty except that of providing bulk, and with it a sense of satisfaction. One can easily learn to dispense with them entirely.

These then are the main constituents that go to making up all foods. We must next see what amounts of each it is necessary to consume to keep a man fit and well. The quantities vary greatly with the different authorities. Mr. Eustace Miles gives a table by Dr. A. M. Davis as representing fairly the general opinion on the subject, though he himself considers the amounts too high; and Professor Chittenden's recent experiments in America with men drawn from such different classes as athletes, soldiers, college professors, and business men would seem to support Mr. Miles' view.

OUNCES PER MAN PER DAY.

	At rest.	At ordinary work.	At hard work.
Proteid	2½	4½	6½
Fat	1	3	5
Sugar and starch	12	14	16
Salts	½	1	1½

Mr. Eustace Miles has found that, with thorough mastication and simple foods, an ounce and a half is sufficient proteid for him even when doing fairly hard work.

Professor Chittenden's experiments were described in one of the American magazines towards the end of 1905. He found that with the different bodies of men already mentioned he could cut down the daily allowance of proteid to about a third of what his pupils had been used to, and this resulted in a maximum of 70 and a minimum of 40 grammes a day (from 2½ to 1½ ounces). As far as can be remembered, the experiment was carried out for a period of about six months, after which time all his "victims" continued with their reduced diets, (which they much preferred to their former and larger meals), and in no way suffered in their health or general fitness.

The penal diet in some of our large prisons at home is also worth considering, for here the problem is somewhat similar to that which we have in the army: how to maintain most economically a man's health. The diet consists of:—Bread, 20 oz.; potatoes, 16 oz.; oat-meal, 8 oz.; milk, 2 oz. On this fare it is found that a convict can do continuous hard work and yet lose neither weight nor health. As he cannot well be made to eat slowly (and thereby extract greater value out of his food, as Professor Chittenden's pupils did), these amounts may fairly be taken to represent what an average man requires in the way of proteid, and from the table given at the end of the article the amount of food necessary to supply this quantity of proteid can easily be worked out. As it is practically impossible to obtain anything like pure proteid, so long as the proper amount of this is provided, the other elements (except salts) can be left to look after themselves.

With regard to salts, a little consideration of where these are to be found, and how they can be fully utilised and not wasted, as they so often are, should help to solve the question. Salts are largely found in fresh vegetables and fruits (in the juices of both), in the husks of cereals (or bran), and in the juices and "scum" of meat. Dried and compressed vegetables and fruits are therefore valueless from a "salty" point of view, as is also white bread, boiled vegetables (for the salts are dissolved out into the water which is thrown away), and boiled and roast meat. The peels of potatoes and apples are very rich in salts, and turnip tops, beet-root tops and many weeds and other plants can also be usefully utilised.

This brings us, then, to the point where the regimental officer steps in. He should know these facts, and though in peace he will probably find it difficult, if not impossible, to get his men to carry out any changes in their methods of preparing food, yet on service, when rations are painfully monotonous, and sometimes short and unpalatable, and can seldom be supplemented from a convenient coffee shop, they may listen to his teachings.

It has already been shown how often the valuable salts of foods are wasted through ignorance of the proper methods of cookery. This subject should undoubtedly occupy a more important place than it does in the education of both officers and men. By this it is not intended that they should go through long "courses" on the subject: a series of half-a-dozen lectures and half-a-dozen practical lessons would be quite sufficient to make any one realise the elements of cookery. Without all this, however, if regimental officers would realise the value of "double cookers," a great step forward would have been taken. The double cooker is a very simple apparatus, consisting simply of one vessel within another and water between the two. The food to be cooked is placed inside the inner vessel, and is cooked by the heat of the boiling water around it. By this means there is absolutely no fear of burning or overcooking, and foods are thus able to be cooked in their own juices without the necessity of adding water or fat to keep the temperature down, and in so doing, extract-

ing many valuable properties from the foods. Vegetables can be cooked with the addition of a little butter or fat, and any juice that exudes should be served up. Rice ought always to be boiled in a double cooker, only sufficient water being added for the rice to take up; otherwise most of the proteid is dissolved out into the water in which the rice is boiled, and is thrown away.

The peels of potatoes, etc., should always be put into the soup as well as any other greens available, provided these are not unpleasant to the taste and are known to be harmless.

Equally important with good and scientific cookery is the thorough mastication of food. It has been shown how Professor Chittenden reduced the amount of food with his pupils to a third of what they were used to before. This result was attained by insisting on leisurely eating and thorough mastication. Whilst rations can be issued in full, this is not, perhaps, an important matter, though it means overtaxing the stomach by giving it more food than it requires. When rations are reduced, however, and men are apt, through hunger, to eat them faster than ever, it means that a larger proportion of a smaller amount is being wasted. The standard ration of 1½ lb. of bread, 1½ lbs. of meat, etc., contains approximately 6 ounces of proteid—more than twice as much, according to Professor Chittenden, as is really required to keep a man in hard work fit. Half this amount should, therefore, entail no hardship whatever if the men will but eat it slowly; indeed, it would probably have a most beneficial result on the overworked inner organs of the troops.

Men should also be made to realise that individuality should be studied, each man finding out what suits him and what disagrees with him; and diets should be varied as much as possible by including, after experiment, foods that are not usually thought of as being fit to eat.

Last, but not least, the numerous fallacies on the subject of diet should be examined, and discarded where they are seen to be fallacies. We have noticed how Colonel Maude believes that a man could live on two ounces of compressed meat and vegetables a day; an amount which probably does not contain more than half an ounce of proteid at the most, for, as one can see from the table at the end, vegetables contain practically no proteid at all.

Perhaps the most common fallacy regarding diet is to confound stimulating properties with nutritive. Thus most people would put down the various meat extracts, cocoa, beef-tea, and mutton broth, as being very sustaining and nutritious, whereas they all contain very little proteid (and hence nourishment), but a lot of stimulating elements which are undoubtedly valuable for getting a sudden spurt out of tired and jaded men.

Another great fallacy is that of men being unable to work on an "empty stomach" as the saying is. Unless a man gets his breakfast at his usual time he begins to experience a "sinking"

feeling in his stomach and attributes it to emptiness. As a matter of solid fact, this sinking feeling is due to nothing else but fermentation of food already in the stomach. It is a fact that those who have undergone real hunger have suffered no pain at all after the first two or three days, that is to say, after the stomach was really empty. The pains occurred during the first few days, whilst the food was fermenting in the stomach. Why the taking of a meal, as a rule, dispels this feeling is because it acts like a fresh quantity of cold water added to some already boiling. The process of digestion is now known to take from twelve to sixteen hours at least, and it is desirable that the stomach should be left in peace for at least the former period once every twenty-four hours, instead of being continually teased with small meals and big. One can soon learn to go for 12 or 16 hours without a meal, and though in peace-time this is seldom necessary, yet it is very important to realise the fact thoroughly, and to get one's men to realise it. Imagination plays such an important part in one's physical state and well-being, that directly men begin to imagine they are fainting from lack of food, they will do so in reality. If they realised that they usually ate at a certain time through sheer greed and not because it was necessary, deprivation of a meal at the accustomed time would possibly have rather an exhilarating effect than otherwise.

It has only been attempted in this essay to touch on what appears to be a very big subject, and one which, considering the large part diet plays in the health of troops on service, is amongst the most important. If all officers and men were conversant with the main principles of dieting, commanders would not be nearly so handicapped by their communications and supplies as they are now, and would, moreover, have far greater confidence in the stamina and endurance of their men.

Government might do something in the matter by establishing at headquarters a chemical analyst who would be charged with examining into, and experimenting with the various foods that are sent on service, or that could be obtained locally in probable theatres of war. He would soon recommend the abolition of certain items at present issued, and the substitution of others, *e.g.*, bottled vegetable juices containing all the valuable salts instead of the dried and worthless fibre that is now sent on service as compressed vegetables. Whole meal flour, too, would be recommended in place of white flour, which is almost devoid of all salts. Besides examining the ordinary foods, the chemical analyst would also test various weeds and grasses for salts and poisons, for there can be no doubt that, with regard to diet, the question of salts is more important than anything else in time of war.

Thus, working from above and below, with everyone thoroughly imbued with the idea that it is his first duty to keep his body thoroughly fit, our army could take the field confident in being able to keep their health, and to endure "privations" which, with a knowledge of dieting, would not be considered privations at all.

APPENDIX.

Table showing the approximate constituents of various foods.

			Proteid.	Starch and sugar.	Fat.	Salts.	Water, fibre, etc.
Beef (cooked)	...	...	34	...	1·5	1·3	63·2
Mutton (raw)	...	...	14	...	19·5	·8	65·5
Fresh fish	...	...	10	...	2·5	1·0	86·5
Eggs	...	...	15	...	16	...	69
Milk	...	...	3	4·5	4	·7	87·8
Cheese (Cheddar)	...	...	33	...	26	4	37
Bread	...	...	8	51	1	1	46
Oatmeal	...	...	14	66	7	2	12
Rice	...	...	8	77	2	1	12
Nuts (average)	...	...	12	9	60	2	17
Potatoes	...	...	1	19	...	1	79
Cabbage	...	...	3	6	·4	1·3	89·3
Lettuce	...	...	1·5	2·5	·4	1	95·6
Spinach	...	...	3·5	4	·5	1·7	89·3
Onion	...	...	1·6	6	·3	·6	91·5
Cucumber	...	...	·8	2	...	·4	96·8
Peas, dried	...	...	21	55	2	2·5	19·5
Lentils	...	...	23	58	2	2·7	14·3

REFLECTIONS ON THE TRAINING OF BRITISH AND INDIAN TROOPS.

By F. O., I.A.

A. W.'s remark in his short, but none the less important, note in the April number of the *Journal* to the effect that A. L. B.'s article, in the preceding number, gives food for thought will be accepted as true by many officers of our Indian Army. Equally will the pertinence of A. W.'s comments thereon find ready acceptance.

I do not propose to deal here with A. L. B.'s suggestion as regards officers in British regiments being required to have some colloquial knowledge of Hindustani, sound as it is, provided that the retention of such knowledge be also insisted on.

I wish to confine myself to certain points, chiefly linguistic, which have an intimate connection with the successful training in peace and leading in war of Indian troops. In a recent article by a London correspondent of the *Pioneer* on the Imperial Scheme, which has lately been receiving Lord Kitchener's attention, appeared the following remarks with regard to South Africa:—"One of the difficulties which will face the Staff will be the language question, for Dutch and British will mingle freely in the recruiting. Two languages in a regiment present an evil, for such becomes a permanent factor against efficiency, and it is obvious that both languages will have to become general by some means not yet devised."

If two languages in a regiment form a factor prejudicial to efficiency, how much more should efficiency suffer in our case, whereas many as three vernaculars may be found in a regiment, where two frequently occur, and where, taking the army as a whole, the languages and dialects spoken must amount to not less than a dozen, possibly many more.

With a view to increased efficiency much pains have of late years been taken to promote homogeneity in the Indian Army. Very few will dissent from the assertion that homogeneity, with its concomitant increase of efficiency, is unattainable while the army lacks a common language. During peace this common means of communication is less obviously essential than in war. It may be even that some British officers feel a certain pharisaical pride in not talking as other men talk, and that such pride helps *esprit de corps*. Desirable as is, *esprit de corps*, it must be fostered in other ways than this. Reflect for a moment; it may well happen, nay, certainly will happen, and often moreover, that a party of Gurkhas, Sikhs, Pathans or other combination, finds itself in a tight place. Instant action alone can save the situation. How is such action to be started without fatal delay when the Commander's orders have to be communicated in as many languages as there are races in the party?

Instances of, to put it mildly, the inconvenience caused in war by want of a common vehicle of verbal communication, usable with ease by all members of a force, could be enumerated almost indefinitely. Many soldiers must have had such inconvenience obtrude itself disagreeably on their notice in time of peace.

The point need not be laboured. It may be postulated that a common language is a factor of prime importance in the promotion of efficiency in any army. This being granted, let us see how we, in India, stand in this connection. In South Africa the difficulty prognosticated by the *Pioneer's* correspondent will not be a small one. In civil life there the English and Dutch languages have been declared of equal status : it will be hard to legislate otherwise for the army. Here no such difficulty presents itself. For generations Hindustani has been the *lingua franca* of the camp, and for long it has been generally admitted to be that of the people at large. All natives of India, even the quite illiterate, owing to their geographical situation, have a singular facility for acquiring a working colloquial knowledge of languages other than their own. Moreover, the vernaculars of a large proportion of our Indian soldiery bear a helpful affinity to Hindustani. Commonsense, therefore, shows this language to be the means of disposing of the polyglot difficulty in our army, the growth of which A. W., doubtless with many others, deplores.

Though unable altogether to concur in A. W.'s suggestion that Hindustani is no longer the *lingua franca* of our army, personal experience leads me to the belief that it is tending to cease to be so. I am, with him, convinced of the desirability of checking this tendency. It seems probable that the reason he assigns for the change, namely, the obligatory language test, is the correct one.

I think it will be admitted that, generally speaking, the standard of colloquial knowledge of Hindustani of British officers of the Indian Army falls a good deal short of what efficiency demands. A remarkable want of conversational facility may be observed, not only among the junior officers but among those on the higher rungs of the military ladder. This cannot be laid at the door of the obligatory test, which was introduced long after the senior ranks should have acquired a serviceable and permanent colloquial knowledge of the language. What appears to have happened in many cases is, that officers have been contented with passing their Higher Standard, which may well be effected with very slight colloquial ability and is merely a foundation, and then practically omitted to take any steps to erect any edifice on that foundation.

When little was done but close order drill, and all military work was cut and dried, a limited conversational power possibly sufficed as far as instruction went ; in these days, when a vast deal more is expected of us and we work on principles mainly, an officer must have a greatly extended vocabulary and considerable facility in its use, otherwise the value of his instruction must be seriously discounted. Further, it is obvious that the intercourse between

British and Indian ranks must be uncomfortably restricted, and at least appear to lack cordiality when on one side or the other inability to converse freely exists.

In brief, I would submit that :—

- (i) We require an army *lingua franca*.
- (ii) That that *lingua franca* should be Hindustani.
- (iii) That a noticeable tendency to drop the use of Hindustani in the native ranks should be checked.
- (iv) That a serviceable colloquial knowledge of Hindustani be demanded of every British officer in the Indian Army, whether he be doing duty on the staff or with troops.

I would further submit tentative suggestions as to how these things, supposing their desirability be conceded, might be brought about.

- (ii) Requires an Army Order stating that Hindustani is the *lingua franca* of the Indian Army.
- (iii) All recruits should be required to begin to learn colloquial Hindustani in the regimental school on joining.

After a squad has been at work a few weeks, drill-instructors should give their explanations in Hindustani as well as in the recruits' vernacular. The vernacular should be gradually dropped and only used when it is plain the recruits fail to understand.

Recruits should be warned on joining that unsatisfactory progress in talking and understanding Hindustani will render them liable to discharge. (I have done duty with Madrassi Mussalmans, Tamils, Punjabi Mussalmans, Sikhs, Pathans and Gurkhas, and believe that, given industry on the part of the man and patience, and skill on the part of the schoolmaster and drill-instructors, any recruit, of those races at any rate, will, before he is ready to be passed into the ranks, have made sufficient progress in Hindustani. The threat of discharge would probably never have to be carried out, but it is well that the Commanding Officer should have the power to use it.)

The Adjutant and officer in charge of the school should occasionally test the progress of recruits in Hindustani.

For trained soldiers all details and explanations in drill and instruction should be given in Hindustani.

In the Orderly Room it should be the exception to hear any language but Hindustani.

All drill and training books should be in Hindustani, transliterated as required until the Roman character is in common use.

- (iv) While the reinstatement of Hindustani as the military language presents little difficulty as regards the native ranks, the same cannot be said in the case of British officers. To meet their case, it appears that considerable modification of the present examination system will be necessary. It has signally failed to bring about a universal, sufficiently high standard of colloquial ability.

This matter asks for our careful consideration, its

importante as bearing on military efficiency and on the scarcely less important point of easy intercourse between British and Indian members of the army cannot be exaggerated.

Some suggestions, admittedly crude, are offered:—

1. The present Lower and Higher Hindustani examinations might be retained as the groundwork of the colloquial skill so much required. But the present colloquial portion of these examinations might be omitted and the translation from English into Hindustani of an entire, actual Summary Court-Martial proceedings be introduced; also the translation from Hindustani into English of the imaginary proceedings at an Orderly-room.

2. Part of the examination for retention in the Indian Army should consist of a fairly high colloquial test, applied uniformly and in such a manner as to ensure with absolute certainty that no officer gets in who does not possess a facility in the language leading to the expectation that he will be able to converse very freely by the time he becomes a Captain, on purely military and such other subjects as frequently crop up in dealing with Indian soldiers. The period allowed for passing the retention examination might be extended to four years, and I would give a *provisional* reward for passing the retention colloquial test of Rs. 500.

3. The obligatory test in special vernaculars to be abolished, except in the case of Adjutants and Recruiting Officers. Means should be devised by which officers may be nominated for these posts some time before they become vacant and leisure afforded them for study. At the time of taking up their appointments these officers should be tested as regards their knowledge of the required vernacular. This test need not be a very high one, but considerably higher colloquially than the present one which, as carried out at present, is on occasions the merest farce. For passing this test I would give a reward of Rs. 200. In the case of a new Adjutant or Recruiting Officer falling palpably short of the appointed standard (which in all probability would seldom or never happen if sufficient time be allowed), his reward should be curtailed by Rs. 50 a month until he passes, for officers other than the above-mentioned a knowledge of the special vernacular of their men is, no doubt, contributory to military efficiency; but, with Hindustani as the *lingua franca* of the army, is not essential thereto. I would therefore place the vernacular, as regards examination and reward, in the category of languages for passing in which rewards are now given, but which have no special bearing on military efficiency. That is to say, an officer on passing in a vernacular by a standard, which should be a pretty high one, particularly colloquially, should be well rewarded, but not required to be re-examined. Some limit must be placed on the number of examinations to be compulsorily passed.

4. Enquiry into the colloquial ability of Hindustani of British officers of the Indian Army should form a part of the annual test. That an officer should be able to impart knowledge is, for us, as

important almost as his possession of it. He cannot do this without sufficient linguistic equipment. In over a score of years I have never known of an inspecting officer concerning himself with the question of the linguistic ability of regimental officers, nor have I had personal experience of a Commanding Officer administering any reprimand for inefficiency in Hindustani, though abundant need for it has been in many cases apparent.

As a proportion of inspecting officers belong to the British service and the Hindustani of some belonging to our own may have somewhat rusted, this carrying out of an annual colloquial test effectually may seem to present some considerable difficulty. The difficulty should not, however, prove insuperable. I venture to suggest a possible solution of it.

If a man is able rapidly to translate a number of colloquial phrases on paper, it is highly probable that he can do the same *vivâ voce*; if they are on the tip of his pen they are unlikely not to be on the tip of his tongue. This proposition being accepted, here is a simple method by which officers' skill in the use of colloquial Hindustani can be tested by inspecting officers. The Chief of the General Staff would cause to be prepared a certain number of different papers, which, on demand from inspecting officers, he would supply, having regard to the fact that the papers for each regiment in one locality should vary considerably in matter, but not in standard or scope, from others for that locality. The inspecting officer would personally supervise the Hindustani test, which would be carried out, as far as seating, not giving indication of identity and so on go, in accordance with the rules now laid down for the conduct of language examinations. On completion he would send the papers at once to the Chief of the General Staff. They would be corrected and classified, say, as good, moderate, or bad, and returned to the inspecting officer in time to embody the results in his report on the regiment.

All officers up to the rank of Captain should be tested. An officer reported on as bad would *ipso facto* refund to Government a portion, say, Rs. 100, of his provisional reward. Officers reported on as good and moderate would be informed accordingly and the latter warned, as they would be if found not up to the mark in any other part of the annual test. Should an officer at his last colloquial test be reported on as bad, he would refund any portion of his provisional reward remaining to him and the advisability of his transfer to some department, where inability to talk Hindustani would not detract from his usefulness, would be considered. Cases of this sort would be rare. I do not believe in the alleged congenital weakness of Britishers as linguists. Any individual amongst us could obtain very fair skill in one foreign language at least, on perceiving that the authorities firmly intended he should do so.

As regards the papers for the annual test proposed above, they should be composed not of catch idiomatic sentences or flowers of rhetoric or high-flown literary extracts, but of such colloquial phrases as would occur in the daily instructional, official and social intercourse

between British officers and the native ranks. A paragraph from one of the training manuals taking about ten minutes to write, might well be given at the end of the sentences; of this a translation need not necessarily be asked for: in fact, the purport, in easily comprehensible language, would be a better gauge of linguistic instructional ability. The Roman character should be used. On the papers the time allowed would be given and this should exceed by very little the time it would take to write the sentences and paragraph quickly in English. If rapidity be not insisted on, the virtue of the examination as an effective substitute for a colloquial test disappears. The whole test from the time of assembling the officers to the sealing of the envelope containing their papers need not much exceed one hour. Arrangements would have to be made for the examination of officers absent from the annual test, either at the place they are at or on return to their regiments. It is suggested above that this test should only be applied to subaltern officers; it might be well that it should be applied to officers of higher rank, until the general improvement, resulting from insistence on heightening our colloquial standard and of a change in method of examination, be apparent.

At the risk of repetition, it may be remarked that all that is required is a good colloquial knowledge; high literary attainments are provided for by present examinations. This colloquial knowledge is no more than a means to an end, and that end is the facilitation of instructional and social intercourse between British and Native ranks in peace and a means in war of rapid conveyance of orders and instructions by British and other commanders to the heterogeneous, polyglot bodies of men under them.

Should the above appear somewhat long-winded to some, I tender them my apologies, but no apology is necessary for ventilating a subject, which many of us cannot fail to consider of the highest importance.

A military *lingua franca* seems an absolute necessity, no less necessary is a permanent, useful colloquial knowledge of it by all British officers connected with Indian troops. Methods hitherto in vogue have failed to meet the case. The obligatory vernacular test has done little more, speaking generally, than give most of us a temporary smattering of the language passed in. The desirability of some change of method is clearly indicated.

II.

Closely connected with the linguistic question are two others, the use of the Roman character, and the translation of the various training manuals for the Indian Army.

A common character is only less important a desideratum for us than a common language. Roman has been chosen for us to supply the want, and admirably it does so. A fear may be expressed, however, that this too may fail in its object unless skill in its employment by both British and native ranks be insisted on. Inspecting officers should not neglect this matter; it must be remembered that more than a few men are of such a temperament that they do not du.

things because they tend to efficiency, but because "the General is very keen on them," or because "the General might ask to see them," not realising that what the General seeks to find out in testing a regiment is whether it is in a state of all-round efficiency, although he may not have time to enquire into everything every year.

No man should be promoted, even to lance naik, who has not reached a certain appointed standard of skill in the use of Roman. C. O.'s should be held responsible that all their British officers can write Hindustani in Roman correctly. It may be hoped that at a time not far remote all training manuals, orders, notices, and so on, throughout the Indian Army, may be written or printed in Hindustani in the Roman character and that all N. C. O.s and a good many sepoy's may be capable of reading them fluently and understanding them well.

As in these times, when so much has to be learnt, every opportunity for simplification should be seized: it occurs to one that the alphabet should be taught to the native ranks, not as we pronounce it, but in some manner indicating the sound of the vowels as they are to be used and that names of consonants should follow some easy system: the Gurmukhi consonants suggest a good one.

The use of Q to represent ق might with advantage be dropped. The sound of ق in Hindustani is identical with that of ك why not use K for them both, and give the men a letter less to learn and the British officers no anxiety as to when he should employ Q and when K? Though their use is not easy perhaps in writing quickly, accents or the long mark for long vowels should on no account be allowed to be omitted. The use of dot or line under a consonant to show it is hard or guttural is not so important perhaps, but all printed matter should have them.

As to the training manuals: there are too many of them, they contain a quantity of matter which is superfluous in the training of even native officers and purchasing them is an appreciable drain on the slender pecuniary resources of our men. Many regimental officers will agree that we do not want translations of the English books, but expurgated editions in Hindustani, containing all that the native ranks should be expected to teach themselves, put in the simplest possible form and language. It seems not improbable that, this being very carefully carried out, all that is necessary might be found to go into one or at most two volumes. A complete index and a glossary explaining the meaning of every English word used in the text should be added, and such English words, whenever they occur, should be marked in some way to indicate that they are English.

It is admitted that the compiling of such a book or books would present great difficulty and require a deal of patient labour, but the trouble and expense involved would not be out of proportion to the advantage gained.

All necessary books should be supplied free to the native ranks, at least one per native officer and N. C. O.s and ten per company for sepoy's.

The above is written in the hope that others, whether in agreement or otherwise with the writer, will come forward and give opinions on the points raised. The Indian Empire is large ; conditions in one part of it vary much from those in others ; there is scope, therefore, for much difference of opinion on points relating to the efficiency of the Army, whose units are scattered about it. It is difficult, however, to believe, but that the majority of us must agree that we want a *lingua franca*, that Hindustani is clearly indicated for it, and that the colloquial knowledge of it we now possess is, on the whole, too slight. That last admitted, many suggestions are wanted as to means of effecting improvement, thus may a satisfactory scheme be devised.

The matter of training manuals for our men, too, is worthy of consideration, for they find the study of the present translations of them a terrible tribulation.

REVIEWS.

Official History of the Russo-Japanese War.

We have received Part IV of the official account of the Russo-Japanese War, issued by the historical section of the Committee of Imperial Defence. The volume brings the account of the operations up to the conclusion of the battle of Liao-Yang. The account is very well arranged, clear, and concise, and is illustrated by an excellent series of maps. As in the previous volumes all comments are withheld, pending the issue of the combined Naval and Military History of the operations. The reader is therefore left to make his own deductions as to cause and effect. The volume loses in interest in consequence, but to any one who has studied the campaign and has already formed opinions, the clear and concise account of the sequence of the operations will prove most valuable. The volume appears to attach more importance to the results of the failure and defeat of General Orlov's force than do other official accounts. The most interesting feature of the battle is the operations of the Japanese first army north of the river. The effect of the unswerving tenacity of General Kuroki though working on wrong deductions is clearly indicated.

There are signs of careless editing, for instance on page 87 the objective of Kuropatkin's counterstroke against Kuroki is given as the left of the Japanese first army instead of the right.

Machine-gun Tactics, by Captain R. V. K. Applin, D.S.O.

Few military subjects excite such general attention in the present day as that of the tactical handling and organization of machine guns, and it is with special interest that we opened the book forming the subject of this review. Captain Applin approaches his subject in no doubtful spirit: he has clear convictions on all the various questions connected with machine guns and their use, and proceeds to state them at length for the benefit of his readers.

The general arrangement of the book is admirable. Starting with the description and organization of machine guns, the author goes on to describe their tactical use with the independent and protective cavalry, with the infantry, in fortress warfare, and in minor operations, concluding with a chapter on the description of gun, organization and tactics adopted by the principal foreign countries.

In Chapter I the subject of the relative value of machine guns and riflemen is discussed, with the result that the author considers a machine gun to be equivalent to 50 rifles in fire value, its mobility equal to that of cavalry, its visibility that of a file (two men) and its

vulnerability such that it is unaffected by a 50 per cent loss. With regard to these results it may be noted that at Hythe the volume of fire of a Maxim is usually taken at 25 rifles and its vulnerability as one-twelfth that of 25 men armed with rifles. The mobility of pack machine guns, at any rate so far as our own army is concerned, can hardly be described as that of cavalry; while to say that a machine gun (possibly with shield) is no more visible than a file of infantry presupposes very favourable conditions for coming into action. The peculiar noise made by the gun, which is bound to attract attention, is also a factor which cannot be ignored.

An important statement, which should perhaps have been placed at the beginning of the first chapter, is made on page 19, *viz.*, that "The tactics of this book are based on the understanding that the machine guns are trained on this system (*i.e.*, of brigading the machine guns of a cavalry brigade into one battery of six guns and those of an infantry brigade into two batteries of four guns each), and that they are mounted on light, adjustable tripods and carried on trained pack horses with the entire detachment mounted." Now, though our regulations permit of two or more machine gun sections of a brigade being brought together for training, it is not the system at present to form them into batteries under a field officer "who would be solely responsible for their peace training and tactical efficiency and who would command them on manœuvres and on service"; our machine guns are not carried on trained pack horses nor are the entire detachments mounted. The conditions then on which the tactics suggested in the book are based, are not those at present obtaining in our service, and it is as well to bear this in mind when considering the conclusions which the author arrives at with regard to the uses and capabilities of machine guns under varying circumstances.*

We may fully agree with the author as to the necessity of having the best officers and thoroughly trained and intelligent men, that the men of the detachment must never be changed or taken for any other work, and that "there is reason to doubt the utility of having machine guns at all if they are not commanded and handled by those who are in every way expert in their use."

The general principles and the methods of applying them laid down in Chapter II are no doubt largely the result of the author's actual experience; they put forward useful ideas and on the whole are not at variance with our training manuals. The employment of indirect fire by machine guns is however new (though embodied in the recent German regulations), it implies high training on the part of the detachment and, in view of the facility with which machine guns can be concealed, hardly seems an essential part of their training.

* It is not intended to suggest that the mobility suggested by the author is unattainable; our principal difficulty is the weight of the present gun and tripod (about 108 lbs.); the adoption of the latest pattern Maxim gun and tripod which together weigh only 60 lbs. would go far to solve this difficulty.

In discussing the employment of machine guns with cavalry the author adopts the theory that they "will go far to render cavalry independent of the rifle and to restore to it that dash and independence of action which made it the terror of the battlefield of the past." Here we think the author has been carried away by his enthusiasm, for the weapon of which he writes, and the natural inclination of a cavalryman for the *arme blanche*. It was never intended that the attachment of machine guns to cavalry should do away with the necessity of its being prepared, where necessity arises, to act by fire; though the guns may, by increasing the volume of fire, necessitate fewer men being dismounted, the day is yet far distant when the cavalryman will relinquish his rifle to rely entirely on the machine gun for fire effect.

In describing the action of the concentrated cavalry division the author lays stress on the position of the machine guns not being in the vicinity of the horse artillery but on the opposite flank. We do not know what justification or authority he has for this distribution, it is usually held that the machine guns should be sent with the horse artillery to work with them and if needs be to act as escort to them.

In Chapters V and VI the author suggests the proper employment of infantry machine guns with the advanced and rear guards, in attack, defence, retreat, and with outposts. The instructions in the regulations are here amplified and impressed on the reader by examples quoted from the Russo-Japanese War. With reference to the instructions on pages 108 and 109 it may be noted that by day infantry do not as a rule form part of the van guard. The extreme mobility advocated for these guns would certainly, if it existed, render them invaluable with a rear guard, and enhance their utility all round even when acting with infantry.

The immense value of machine guns in fortress warfare was very clearly demonstrated at the siege of Port Arthur. In Chapter VII Captain Applin points out, by means of examples of their use, the principles which should govern their employment. A very useful map showing the position of the forts and distribution of the machine guns to the defences is given.

Chapter IX contains a great deal of interesting information on the subject of the machine guns of the principal countries, their organization and method of employment. The German regulations are fully quoted and serve to show the important place machine guns already hold in the war organization of that country. The detailed instructions in both the German and Japanese regulations (the latter country has recently issued special regulations for cavalry machine guns) as to the use of these guns with cavalry serves to emphasise the somewhat meagre references to the subject in our own *Cavalry Training*: it is understood however that this deficiency will shortly be remedied.

We should have liked to hear what Captain Applin has to say on the subject of the best means of successfully attacking machine guns,

but he, in common with the regulations, makes no direct reference to this interesting point.

The book is written by an evident enthusiast who perhaps naturally is inclined to be a little too optimistic on the subject of his hobby. Although machine guns have formed part of our armament for many years, we as a nation do not seem hitherto to have realised their full value, and possibly have not yet arrived at the best method of employing them, and this book should do good in drawing attention to the potentialities of the gun and in arousing interest and discussion as to its correct organization and employment.

THE JOURNAL

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No. 181.

SECRETARY'S NOTES.

I. NEW MEMBERS.

The following Members have joined the Institution during the months of June, July, and August 1910 :—

76	Major F. R. Lawrence.	105	Capt. L. B. Cloete.
77	Lieut. F. G. Powell.	106	Lieut.-Col. R. S. F. Henderson, M.B.
78	Major T. T. Gresson.	107	Rangoon Brigade Library.
79	Capt. A. J. M. Binney.	108	Major A. H. G. Thomson.
80	Capt. J. H. Bowes-Wilson.	109	Lieut. J. de S. Spooner.
81	Capt. F. G. Gillies.	110	Capt. J. E. Cruickshank.
82	Lieut. G. de la P. Beresford.	111	Capt. J. D. Crowdy.
83	Major A. Buist.	112	Capt. J. C. Freeland.
84	Lieut. E. C. de R. Martin.	113	Mess Secretary, 104th Rifles.
85	Capt. Belgrave (Subscriber).	114	Major E. Pearce-Serocold.
86	Officer-in-Charge, 1st Peshawar Division Library.	115	Capt. H. Wood.
87	Capt. C. B. Thackeray.	116	Major H. Costley.
88	Capt. A. Dickson.	117	Officer Commanding, Australian Intelligence Corps.
89	Capt. H. C. S. Ward.	118	Major C. Ainslie.
90	Major H. L. Tomkins.	119	Capt. L. F. Ashburner.
91	Major J. H. Crawford.	120	Capt. T. E. Hulbert.
92	Officer-in-Charge, Presidency Brigade Library.	121	Capt. K. D. Murray.
93	Major F. W. H. Walshe.	122	Major T. R. Phillips.
94	Lieut. D. C. Wace.	123	Garhwal Brigade Library.
95	Capt. D. Robertson.	124	Capt. A. T. S. Dickinson.
96	Messrs. Hugh Rees & Co., Ltd.	125	The Mess Secretary, 31st Lancers.
97	Officer-in-Charge, Bangalore Brigade Library.	126	Lieut. E. F. Harrison.
98	Capt. H. Hill (Life).	127	Honorary Secretary, R. A. Mess, Abbottabad.
99	Capt. L. R. Vaughan.	128	Herrn A. Kinserling, St. Petersburg, Russia.
100	Lieut. E. S. Gibbons.	129	Lieut. W. S. E. Money.
101	Lieut. C. C. Bamber.	130	Capt. J. L. Murphy.
102	Ahmednagar Brigade Library.	131	Capt. W. B. White.
103	Capt. G. P. Grant (Life).		
104	Capt. A. C. Ellis.		

II. TACTICAL SCHEMES (Q. I. Series).

10. To assist officers studying for Q. examinations, tactical schemes are issued by the Council of the Institution, to members only, on the following terms : —

Rupees 5 per scheme, or Rs. 50 for a complete series of ten schemes, these charges including criticisms and solutions by a fully qualified officer selected by the Council.

Two revised sets of schemes (Series IV and V, 10 schemes in each series) are now available.

A number will be allotted to each member applying for papers, and solutions must be sent under these numbers to the Secretary, United Service Institution of India, who will forward them to the appointed officer.

III. MILITARY HISTORY PAPERS.

11. In order to assist candidates for the Staff Colleges and other officers in the study of military history, the Council of the Institution have decided, as a tentative measure, to issue, to members only, sets of questions on selected campaigns. The following papers are now available : —

- (a) Two sets of six questions each on the Indian Mutiny.
- (b) Two sets of six questions each on Callwell's Small Wars.
- (c) Two sets of six questions each on the strategy of the Russo-Japanese War.
- (d) Three sets of six questions each on the Battles of the Russo-Japanese War.

The charge for these papers is Rs. 5 each, or Rs. 45 for the set of nine, including criticisms by fully qualified officers selected by the Council.

A number will be allotted to each member applying for papers, and solutions must be sent under these numbers to the Secretary, United Service Institution of India, who will forward them to the appointed officer.

IV. CHANGES OF ADDRESS.

Members are requested to keep the Secretary informed of all changes of rank, title or address.

V. PRESENTATIONS.

Field-Marshal Earl Roberts has presented a large autograph photograph of himself to the United Service Institution.

A NOTE ON NIGHT OPERATIONS.

BY BREVET LIEUT.-COLONEL W. D. BIRD, D.S.O.

Night operations, though by no means a new departure, for they have on occasion been employed throughout the ages of which we possess authentic military records, have of late assumed a more prominent place than heretofore in war, and in training for war, owing to such actual or projected developments in equipment and armament as dirigible balloons, airships or aeroplanes, long range quick-firing artillery, machine guns, magazine and automatic rifles, and smokeless powder. It is this fact, and the difficulties inherent in night operations, that render them so interesting to study, and though, no doubt, tiresome to perform, so necessary to practice.

Probably all ranks dislike the idea of a night attack, though not perhaps so much as the feeling that they may be attacked by night, and in this dislike and fear lie many of the arguments for and against night operations.

Night work is distasteful, because harassing and hazardous. Harassing, since men are deprived of sleep, and because the nervous strain of moving towards an ever present, though unseen danger, is greater even than that of facing a storm of shot and shell. Hazardous, for the reason that surprise, the very essence of successful night attack, is, or should be difficult; because more is and must be left to chance than is the case during daylight; because mistakes are probable; because accurate information is as necessary as it is hard to obtain; on account of the liability of troops to panic; and, because, owing to the difficulties of leadership, and to the confusion inseparable from close fighting by night, complete success is problematical, though the prospects of obtaining local advantages are more promising.

Frederick the Great said: "I am determined never to attack by night, on account of the confusion which darkness necessarily occasions, and because the major part of the soldiery require to be under the eye of their officers, and under fear of punishment, to induce them to do their duty."

Wellington wrote that, in his opinion, night attacks, on good troops, were unlikely to succeed.

Yet, in spite of these weighty pronouncements, night operations have become almost the rule in modern war, for the reason that surprise, the very herald of victory, is possible; that night attacks are feared by all troops; that casualties are lessened, and probability of success therefore increased; that concealment of movement and numbers is obtained; and, lastly, that saving of time, which is as valuable in war as in business, is effected.

Still, since chance plays a more prominent part in night operations than in those undertaken by day, it may safely be said that

night work will only be undertaken when the object cannot, without undue loss of life, be attained by daylight.

Night operations are now divided into three classes—night marches, night advances, night attacks.

Night marches may be made—

- (i) To gain time or to inflict surprise on an opponent, by transferring a body of troops from one place to another under cover of darkness.
- (ii) To pursue, or escape from the enemy.
- (iii) To avoid heat.

Night advances are justifiable when it is desired to gain time and incidentally to avoid loss—

- (i) By crossing at night a portion of the fire swept zone, and establishing troops within effective range of the enemy's position, or of his advanced troops; or (ii) to reach localities whence attack at dawn can advantageously be launched.

Night attacks may take place—

- (i) To confirm or complete a success attained by day.
- (ii) Because the enemy's position has been so well defended that close approach was not possible by daylight.
- (iii) As a last resort—

When the opponent has gained some position from which he must be ousted at all costs.

To cover a retirement.

To conceal the assailant's weakness, in the hope of obtaining the advantages of surprise.

- (iv) To force an enemy, such as a North-West Frontier tribe, to battle.
- (v) To harass the enemy.
- (vi) To delay the opponent, and to hold him to his position.
- (vii) In siege warfare.

In every single case except that of pursuit, careful reconnaissance, even at the risk of alarming the enemy, is, it is submitted, essential to success, and reconnaissance in conditions of light similar, or as nearly as possible similar to those in which the march or attack is to be made.

To examine the enemy's position closely prior to night operations, is merely to follow the dictates of common sense, for it is fully established how difficult, in darkness, is movement over ground that is even well known. Yet, how often, in war, owing to over-confidence, to inadvertence, or to the danger and difficulty of reconnaissance, has the risk of undertaking night operations over an area not closely reconnoitred, even by day, been accepted.

In 1799, Wellington, referring to the failure of the night attack on a post during the siege of Seringapatam, wrote: "I have come to the determination, when in my power, never to suffer an attack to be made, by night, upon an enemy who is prepared and strongly posted, and whose posts have not been reconnoitred."

It is well known, moreover, how much the success in 1878 of the night march to turn the Afghan position in the Khyber, and of the night advance to turn Peiwar Kotal, of the operations in 1899 against Stormberg, and of the assault on Magersfontein, was compromised because reconnaissance was executed from a distance, and by daylight.

The Japanese, in Manchuria, who were great exponents of night operations, are reputed to have been careful closely to reconnoitre and observe ground over which attacks were to be made, and since their percentage of actual* failure was small, it would appear that their caution was justified.

It seems, then, that in spite of difficulty and danger, no night operation against an enemy, civilised or savage, should be launched until, either the ground to be traversed has been reconnoitred by night, or measures have been taken for the inception of such reconnaissance during the advance of the troops; and a civilised foe should, during the execution of the night operation, be kept under close watch, for he may attempt a like enterprise.

A warlike undertaking has rarely been begun by a great commander without every precaution that human skill and forethought could devise to insure success; and more rarely still has a foolhardy venture succeeded. Napoleon, the most daring of leaders, was one of the most careful.

Reconnaissance for night operations may be divided into two categories:—

- (i) That carried out under cover of advanced troops, which though by no means easy, involves but little personal risk.
- (ii) That which seeks closely to examine the enemy's positions, and is at once difficult, and attended by great personal danger.

In both cases the officer or officers detailed for night reconnaissance work, (and it is submitted that one or more officers, accompanied by two or more scouts, according to the circumstances of the case, must undertake this duty,) should, if the distance to be traversed is more than one mile, no matter how urgent the reconnaissance, make a rough enlargement from the best procurable map of the route to be followed, marking important features in heavy type. If the reconnaissance work is to be carried out during the advance of the troops, the sketch should be divided into sections of convenient length, according to the distance to be traversed, so that as it is completed each section can be forwarded to the leader of the column by one of the scouts, who will remain with the column and act as guide.

When it is possible to overlook ground to be traversed the reconnoitring officer should study it through glasses, or, better still, should draw a panorama, which will impress the physical features

* It has been computed that in 50 per cent of night attacks the Japanese were successful; in 30 per cent partially successful; and that 20 per cent. of their attempts failed.

on his mind. If a sketch is made, prominent landmarks, positions held by the enemy, distances between points, etc., should be emphasised and so impressed on the memory.

Bearings should also be taken on important features, and in the direction it is proposed to march. Such a common object as a tree is not, for obvious reasons, as a rule a suitable landmark; nor is a star unless the reconnoitrer knows something of astronomy, a reliable guiding point.

It is well to recollect that the frontage reconnoitred should be that to be filled by the marching or attacking force, and that areas of gravel, loose stony soil, hard sand, high crops, or frozen snow, which cannot be crossed without noise, should if possible be avoided. If the reconnaissance is of such a nature that accurate pacing is required, one officer should undertake to pace, and note features of ground, another being responsible for direction.

A small detail, but one perhaps worth remembering, is that if a note-book is used in the reconnaissance it should have a strap under which can be fastened the leaves as they are filled; and as it is easy by night to lose a pencil, the latter should be attached by a piece of string to the note book or sketch.

If the same officer is to carry out the reconnaissance first to, and secondly beyond, a position of deployment he should, since the second enterprise is precarious, despatch his first report before commencing the second.

When reconnaissance is undertaken prior to the assault of a position on which troops have closed by day, the reconnoitrers can hardly hope to do more than furnish from memory, assisted by a few notes, a description of the intervening ground, of the enemy's dispositions, and of the situation of his mines and obstacles.

In night operations infliction of surprise to a greater or lesser degree is almost essential to success; hence it would at first sight appear that they should be undertaken in what is called by seamen "dirty weather." On the other hand, night operations will meet with no success unless conducted in an orderly and methodical manner, and so to manœuvre large bodies in bad weather is almost impossible. Hence it would seem that for night enterprises on a small scale rainy dark nights are most suitable, whilst for large undertakings fine bright nights are best adapted.

The formations to be adopted in a night operation, the troops to be employed, and their positions in the attacking column, are regulated by the conditions in which the enterprise is undertaken.

Cavalry and guns, when the enemy is not close at hand and when roads are available, or ground is open and without obstacles, can cover considerable distances at rapid pace, and are therefore useful for such enterprises as seizure of an important locality, wide turning movements, surrounding and capture of an isolated detachment.

In other circumstances, that is when in the vicinity of the enemy, horsemen and artillery, unless the latter are in position, lose their relative importance at night, but are required at daybreak.

On the other hand cavalry, and all field and lighter guns, can for short distances move much more rapidly than infantry. Hence the bulk of cavalry and perhaps all except a few pack guns, may, when making a night march or undertaking any other night operation in the presence of the enemy, be relegated to the rear of a column, or even kept back out of night operations.

When moving on roads ordinary march formations and distances may be employed by troops at night, but the advanced guard may be relatively weak, for it is only required to guard against surprise. Since the object, for concealment's sake, is to reduce the length and breadth of the column, the advanced guard and flankers may march only a relatively short distance from its head and flanks.

Connection, whether in column of route or other formation, should be kept from rear to front, and inwards towards the directing flank. For this purpose each unit, battalion, company, etc., should have at its head, or on its inner flank, a group of connecting files, ready to string out when distance is lost, and to close in again when checks occur.

Connecting files should be linked, or should bear some distinguishing mark or marks to prevent them from being confused with orderlies, messengers, etc., whose presence may otherwise cause loss of touch and direction.

If troops are to change from march to assault formations after moving a certain distance, the position of deployment should be chosen with reference to the character of the enemy, the nature of the ground, and the meteorological conditions. It should however probably be not less than 1,000 yards from the enemy's most advanced posts, and wherever deployed the force should, to insure correct alignment, form up on markers dressed on a compass bearing.

To attempt deployment nearer the opponent is to risk surprise when carrying out this delicate manœuvre; to deploy further away is to involve the troops in the difficult operation of a long advance across country in a formation ill adapted to this purpose.

When, as in siege warfare, regiments are to advance to positions which it is intended, before further movement is undertaken, to secure by intrenchments, the march formations should be at once suitable to the ground and should facilitate rapid movement and deployment. Perhaps lines of columns of fours, preceded and connected by scouts, etc., satisfy this condition, but units should, if possible, be deployed in succession on the frontage to be intrenched.

Since the object, in night attacks on a large scale, is usually to gain the desired end by shock action, the formation should be such as to insure the greatest possible concentration of effort. An assaulting column should therefore, it is suggested, move and attack in compact, not in linear formation, though it must always be preceded and flanked by patrols, scouts, or skirmishers.

A compact formation is easy for marching, and inspires the troops with confidence; moreover, a dense column will, in spite of its depth, be less vulnerable than a line, for by night, even when

searchlights are used, concentrated fire, other than that obtained by use of machine guns, is hardly realisable except in a few localities where special arrangements have been made; and men, when the alarm of night attack is given, are more than likely to shoot straight to their front.

The idea is, in short, that by night the Napoleonic tactics of a crushing blow delivered in mass should be adopted by large forces or by portions of large armies, linear tactics being abandoned on such occasions. When a small force moves by night against a small force, envelopment is however indicated as the method best suited to the achievement of success.

In all night attacks silence should be preserved until in the enemy's lines, in order that he may, as long as possible, remain uncertain of the position and strength of the assailants.

Supports to an assaulting column seem to be required, and these should, perhaps, move 300 to 400 yards behind it, carrying intrenching tools. It is true that when supports are so far back many men will be required for maintenance of connection with the troops in front, but if the supports are nearer to the assaulting column they will inevitably be drawn into the first charge, and will therefore cease to be supports.

Supports may be followed by reserve ammunition, and by machine and mountain guns, though these are probably better with the reserve.

The reserve should be small in proportion to the strength of the attacking column, for the timely and effective use of a large reserve requires an accurate and immediate knowledge of events which cannot be possessed by night. It should intrench about 1,000 yards from the enemy's position, so as to form a rallying point in event of sudden panic and disaster, but should be prepared, in case the fight is doubtful, to throw its weight into the action—for even the most indecisive victory is better than the most orderly retreat.

Close connection must naturally be maintained between the assaulting troops, supports, and reserves.

It has been argued by some that as victory is the aim, no reserve should be detailed in night operations, but every available man used to deliver the first blow and to make it decisive. Such policy appears to carry the theory of concentration of effort to an extreme, and extremes usually defeat their own purpose.

Similarly, the wisdom is more than doubtful, of the plan said to have been often adopted by the Japanese, who concentrated from a considerable frontage, every, or almost every man, in order to form a strong assaulting column.

This procedure, since the enemy's troops are not contained even by fire action during the assault, leaves them free to move not only reserves, but even men from other portions of the line, to the locality where the fighting is taking place, though it may be urged that by night no defender, though provided with searchlights, would dare to run the risk of leaving part of his frontage weakly occupied. Even

so, supposing that the assault is only partially successful, as was frequently the case in Manchuria, the enemy can, when day breaks, concentrate fire on the position half captured by the assailants, who will not have sufficient troops available to divert attention from this point. It would, therefore, seem wiser to leave enough troops to hold the enemy to his trenches in localities other than that to be assaulted.

In view of the fact that, as was the case at Spion Kop for example, the main danger to be feared by the successful assailant in a night attack is subsequent envelopment, security of flanks must be the first care ; and though it is usually risky to follow up too far a successful night assault, owing to the disorder into which the attackers must and do fall, and to the fact that the ground traversed will probably be unknown, still contact with the beaten enemy should always be maintained by means of patrols.

When trenches are to be made, they should be sited on compass bearing, and carefully marked out by tape or on markers, or daylight may find them facing in the wrong direction.

Night attacks are essentially precarious ; hence, if several columns are employed, the risk of error and failure is unduly multiplied. It is therefore desirable to concentrate effort on one night operation, though it is to be remembered that the size of an assaulting column is limited by the number of troops that can, in the local topographical conditions, attack without excessive confusion and disorder.

When more than one column is employed each should be sufficiently strong to achieve local victory without dependence on the success or failure of the others, for mutual support is hardly possible by night.

It has been stated above that the order of march to be adopted by a column advancing to assault an enemy's position at night should be compact, and formations which seem suitable are, line of company columns at close interval, or quarter column moving to a flank in fours.

The hour at which the advance or attack is made will depend on the object which it is desired to attain, but a sound rule will be so to time the march, or assault, that if successful the troops may be able to secure the captured positions before daybreak. The attack can then be continued, or commenced, as the case may be.

Orders for night operations must be precise, little or nothing being left to personal initiative. All ranks must know exactly what they are to do during the advance, and when the position is taken. Everyone, too, should be told the nature of the ground to be crossed, and should be given a description of the position of deployment, if there is one, and of the enemy's formation, so that each may know what to expect, and that surprise by the enemy may as far as possible be avoided.

The assaulting troops should be told what action is to be taken by the rest of the force, and conversely the remainder of the troops should shortly before it is delivered be made aware that a night

attack is to take place. No change of plan should be made once the enterprise is launched, for not only will such variation be most risky, since it will in every sense of the word involve a leap in the dark, but the reliance of the troops on their leaders will be shaken at a time when confidence is essential to success.

The marching pace, in night operations, should be deliberate and consistent, and halts should be made at stated intervals of time, or distance, to allow of re-formation, and to check direction.

One word about the defender at night. When attacked by night the defender's usual object is to gain time for arrival of reinforcements. It follows that each piquet, if the piquet line is that of resistance, or each portion of the main defensive line, should hold fast to its position irrespective of the success or failure of the troops on the flanks, and whether the enemy's soldiers have or have not passed beyond its trenches.

One stubborn piquet may break the waves of an attack, and if he waits until daylight surrender is almost the only alternative left to an assailant who has penetrated the first line of a position without causing the defender to retire, and has subsequently been checked by supports and reserves.

Since it is as a rule easier by night to reinforce than to retire on reinforcements, it would be advantageous for the piquet line to be the line of resistance. But in large forces piquets must usually be pushed beyond the defensive position, such arrangement may therefore rarely be practicable.

As the attacker looks for success by night to the influence of surprise and cold steel, so the defender should try to beat the attacker with his own weapons, first surprising him by fire, and then, as soon as reinforcements arrive, charging before he has time to recover his mental balance.

If however it is unwise to push a night attack too far, the same rule will apply to counter-attack, which will probably be made, with every available man, where the enemy is fighting most strongly. At night, the principle of relieving pressure in one locality by success in another is hardly applicable.

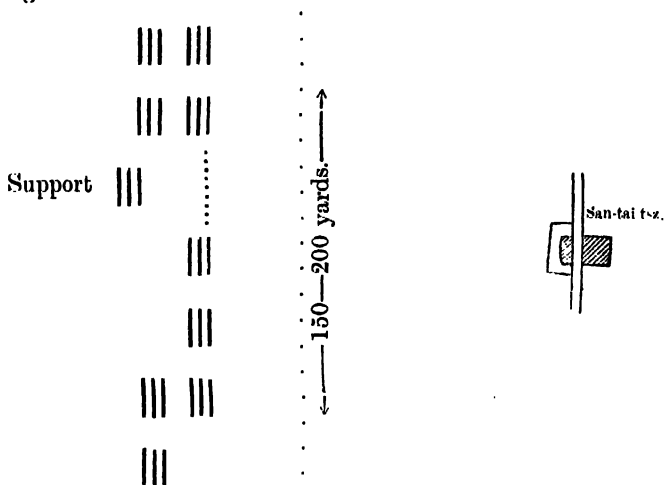
In conclusion it is proposed to quote certain typical examples of night operations in the Russo-Japanese War, which seem at once to illustrate the principles which have been set forth and to show the difficulty and danger, as well as the advantages, of these undertakings.

During the battle of Mukden, in the course of the operations of the 3rd Army to envelop the Russian right, part of the 1st Division found itself on 9th March obliged to advance over an open, cultivated, but slightly undulating plain, against a line of fortified villages lying north of Mukden city.

The 15th Regiment of this Division was checked about 1,500 yards from the Russian position at the village of Santaitz and further advance by day being found to be impracticable, it was determined to carry the place by night assault.

For this purpose the Japanese collected at 1 A.M., out of 1st Division, but mainly from the 15th Regiment, some 13 companies. These were divided into four groups; two to assault, of five and four companies respectively, each under a battalion leader; one company* as support under the commander of the 15th Regiment; three companies as reserve, under a brigadier, and placed in a ditch 1,500 yards from the village.

The column marched off in the formation shown in the accompanying sketch.



The two groups detailed to deliver the assault moved in lines of companies, in company column, preceded at 50 yards' distance by a couple of sections in extended order. Between the groups was an interval of 50 yards, filled by 10 connecting files, and the distance between the lines of company columns was 20 yards. The support followed in the space between the assaulting groups.

The Russian outposts were met about 50 yards from the village, when, contrary to instructions, the sections in extended order opened fire.

The whole assaulting column at once charged, without attempting to deploy, and after a short struggle, Santaitz was carried, the Japanese pursuing for 600 yards.

On 6th March, during the attack of 2nd Japanese Army on the line of fortified villages lying about 7 miles south-west of Mukden, part of 8th Division adopted a somewhat different procedure.

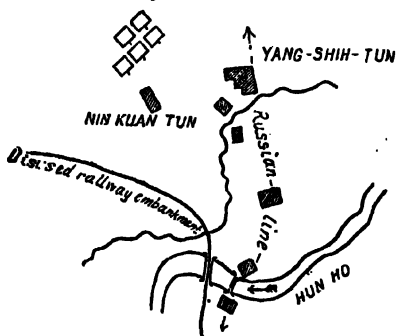
During the day the left column of 8th Division reached Nin-kuantun, a hamlet about 1,300 yards from the Russian position, which consisted of a series of fortified villages connected by intrenchments. It was now found that the intervening ground was so open, and

* NOTE.—A regiment consists of 3 battalions, a battalion of 4 companies, each about 200 strong, and a company of 3 sections.

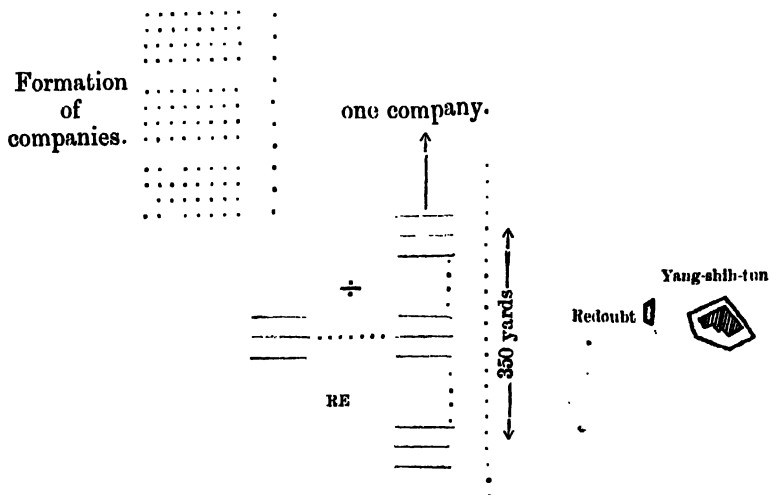
devoid of cover, that further attempts to advance were abandoned, and a night attack was planned on the village of Yangshihtun and on a redoubt about 200 yards to its front.

At dusk an attacking force, 3 composite battalions, all picked men, with 16 hand mortars, was therefore assembled, in 5 columns, under cover and some 1,100 yards north of Ninkuantun.

Attacking Column.



Shortly before 2 A.M., the hour settled for the advance, lines of companies, in company column, moving to a flank in fours, were formed, with 10 yards' interval between companies.



The companies were divided into groups of three, each under a battalion leader, and were drawn up in two lines, nine companies in first, three in second line. At 10 yards' distance behind the leading line marched the mortars, and some engineers, the second line following at the same distance behind the mortars. The regimental commander moved with the second line, and the whole column was

linked up both laterally and vertically by connecting files, and was preceded, at about 100 yards' distance, by scouts.

No talking was permitted during the advance, but, when touch was lost, word was passed along the column, and measures were taken for its re-establishment by despatch of connecting patrols.

The objective was the Yangshihtun redoubt, which was to be enveloped and captured by way of its gorge, and to this end the column was to deploy 200 yards from the work.

One officer guided each group of three companies, by means of landmarks, such as trees and graveyards, which were, however, confusingly numerous. No use was made of stars or compass.

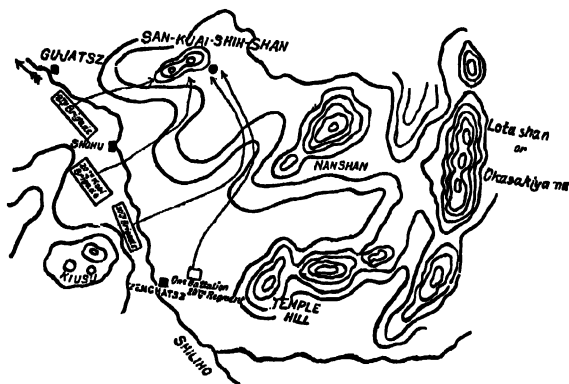
Undertaken under these auspices, the march was not successful, progress being so slow, and halts so frequent, that day was breaking when the column commenced to deploy.

The Russians now began to fire, throwing the troops into confusion; and to assist the officers in restoring order, the regimental commander ordered the mortars to move forward and open fire.

To clear the way for the mortars a few men were directed to retire; the fatal word spread to the remainder, and the whole fell back.

The repulse of a column, composed of picked men reacted unfavourably on the 8th Division, the troops naturally arguing that they could not be expected to succeed where a *corps d'elite* had failed.

The attack of part of the Japanese 4th Army, during the battle of the Sha Ho, on an isolated and rocky hill, with two peaks, known as Sankuaishihshan, is an instructive example of night operations.



During the earlier stages of the battle, the advanced troops of 1st and 10th Russian Corps were holding the line from Sankuaishihshan, through Nanshan, to the Lotashan group, though Temple Hill had been captured by the Japanese, who also held the Shiliho north-west of that point.

The intervening area between the Shi-li, and between Sankuaishihshan and Nanshan, which are about a mile and a half from one

another, is slightly undulating plough land, but was considered by the Japanese too open to justify attack by daylight. It was therefore decided to cross this space, about a mile to Sankuaishihshan, and two miles to Nanshan, during the night 11th-12th October.

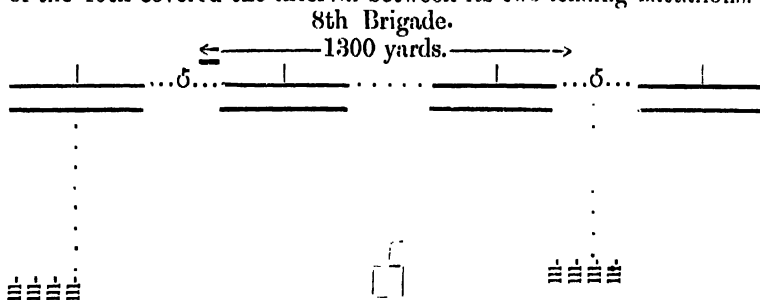
To 10th Division was confided the attack of these localities, and of its brigades the 8th was directed to move against Sankuaishihshan, and the 20th Brigade against Nanshan, the latter co-operating with the 15th Brigade, 2nd Division, which would advance from Temple Hill on Lotashan. To the 8th Brigade was allotted the area north-west of a line drawn from Shohu to the north of Nanshan, and the brigade was to cross the Shiliho south-east of Gujatsz. The 20th Brigade was to move on Nanshan, passing the Shiliho between Shohu and Zenchatsz.

The 20th Kobi Brigade, as divisional reserve, was to march in the interval between the other two, and 550 yards behind them.

The 8th Brigade advanced with the 40th Regiment on the right, the 10th Regiment on the left. The front line was formed of four battalions, two from each regiment, marching in line, two deep. The interval between battalions was 50 yards, between regiments 60 yards. The respective regimental commanders marched in the space between their two leading battalions.

The remaining battalions of the brigade formed a support under the brigadier, and, moving in line of companies, in company column, at close interval, followed the others at a distance of 350 yards.

The supports were, however, not together, for the battalion of the 10th Regiment marched behind the left of the front line, and that of the 40th covered the interval between its two leading battalions.

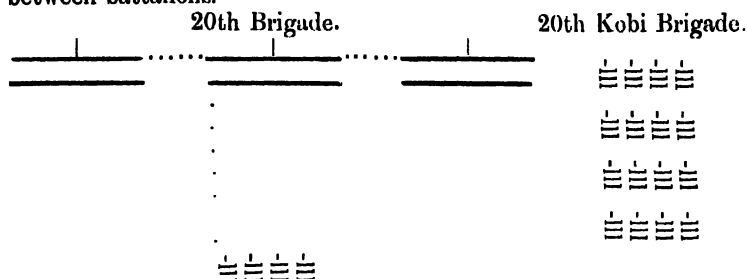


The usual scouts and connecting files were employed, and the guides attempted to obtain direction by moving on landmarks, without the assistance of the compass.

Of the 20th Brigade two battalions had been lent to 15th Brigade, but the four remaining battalions moved in a formation similar to that adopted by the 8th Brigade.

In front were three battalions, in line, two deep, the two battalions on the left belonging to the 39th Regiment, that on the right to the 20th Regiment. The remaining battalion of the 39th followed, at 250 yards distance, in line of companies, in company column, at close interval, and behind the centre of the leading line.

The 20th Kobi Brigade was in mass, or column of battalions, in line of company columns, at close interval, and at 65 yards' distance between battalions.



The men all wore great-coats with white bands round the left arm, leaders, etc., having other distinguishing marks, and connecting files carrying flags.

Orders were issued that supports and reserves were not to fire, and the leading troops were, if possible, to refrain from doing so.

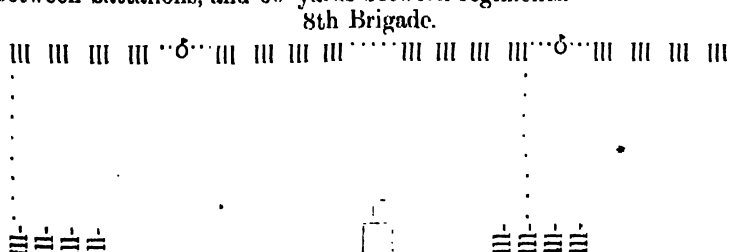
The signal to advance was a bonfire lighted at 11 p.m. on Kiusu Hill, an arrangement liable to give warning to the enemy that something was in the wind. Since one bonfire was lighted, two might just as well have been made behind the line of advance of each brigade, to assist the guides in maintaining direction.

As was to be expected there was much confusion and checking during the advance of the 8th and 20th Brigades, and, in addition, the latter lost direction, after quitting a track leading from Zenchatz to Naushan.

In the 8th Brigade the supporting battalion of the 10th Regiment also failed to keep touch, but found the column by sending out scouts, who reached Shohu. Aware that his brigade was to march north-west of that village the commander moved in this direction, and so regained his place.

Similarly, the right battalion of the 20th Brigade became separated from the column, but recovered its position by means of patrols, which met those despatched by the battalion on its left.

The confusion in the 8th Brigade finally became so serious that the brigadier took the extreme step of changing the formation of his front line to line of companies in company column moving to a flank in fours, at 25 yards' interval between companies, 50 yards between battalions, and 60 yards between regiments.



Soon after completing this change in formation, the 8th Brigade met with the Russian outposts, 700 or 800 yards from Sankuaishihshan, who at once fell back.

On the alarm being given, the Russian garrison of the hill and of the village and of the trenches in front of it opened a tremendous musketry fire, and the 8th Brigade, having now a definite objective, advanced towards the flashes.

So heavy and continuous was the firing that the commander of the 20th Brigade, perhaps because his men were suffering loss, perhaps because he did not care to advance on Nanshan with an uncaptured position on his flank, possibly fearing disaster to the 8th Brigade, or it may even be glad enough to find a point on which he could march, wheeled his troops half left, a difficult operation considering the formation and other circumstances, and advanced on Sankuaishihshan.

In addition, the officer commanding 20th Regiment, who had accompanied the two battalions lent to the 15th Brigade, finding his men were not urgently required, and alarmed by the Russian fusillade, obtained permission to move one battalion to the assistance of the 8th Brigade.

Finally, the divisional reserve also changed direction, and marching on Sankuaishihshan, reached a point between the two peaks thus filling the interval between the 8th and 20th Brigades.

Fifteen battalions, therefore, attacked on a frontage of about three-quarters of a mile. The Russians, though greatly outnumbered, made a gallant fight for the position, holding the village until daybreak.

The importance of night operations in war is, it may be supposed, generally admitted; their difficulty has, perhaps, been shown by the examples quoted. It remains to suggest how such difficulties may be overcome.

Familiarity is said to breed contempt, and whether this is or is not true, it is certain that the human mind surrounds with imaginary peril undertakings new to it, whereas custom robs danger of half its terrors.

It seems then that if all ranks are accustomed to work by night, night operations, though they will never be easy, will lose some, if not much of their peril.

It is suggested, therefore, that night operations, both of large and small forces, should be made almost the rule in training, for besides inspiring the troops with confidence in themselves, and confidence is half the battle, frequent practice by night will enable all the complicated problems of night work, connected with formations, leadership, reconnaissance, use and avoidance of obstacles, search-lights, etc., to be studied and solved.

PRACTICAL COMBINED TRAINING.

BY MAJOR-GENERAL J. L. KEIR, C.B.

If an ordinary military operation could be worked out in a certain area of country, first as a staff ride, then with actual troops in the form of manœuvres, and finally put to the test of actual war, what an astonishing difference in the results we should meet with ! But although the picture presented by actual warfare would differ strangely from that we are accustomed to witness at manœuvres, it is questionable whether the difference between the two impressions would be much more astonishing than that which actually exists between the ideals of a staff ride and the actual performances of the troops at manœuvres.

To put this mathematically, it may be stated as a simple rule of three sum. For let S = Staff Ride, M = Manœuvres, and A = Active Service, we may say $S : M :: M : A$.

In the words of Euclid, "let it be granted that this is so."

Now we have no means of comparing M and A, but we can to some extent compare S and M. It is in fact the difference between pure theory and practice as far as the conditions of peace will allow us to form an opinion of it.

My contention is that staff rides, though very useful in their way, are but an indifferent substitute for work in the field. In a staff ride each patrol goes where it has been sent, sees what it ought to see, returns to its C. O., whom it finds without difficulty, and reports to him in the shortest possible time. The execution of a combined attack is the simplest thing imaginable. The communication of orders presents no difficulty. The guns go the right place and open and cease fire at the moment they are expected to. The cavalry have no difficulty in locating the enemy's position and at once send back brief and luminous reports, and so on. It is only when we come to deal with flesh and blood that we encounter the "frictions of war" and learn how easily things go wrong. No matter how simple a plan may be, it can never, like the De Dion car, be made absolutely "fool proof." The lame horse, the foggy morning, the tired, the casual, and the unimaginative officer; the C. O. who has lost communication with the scattered portions of his unit; and the scout who never sees anything, but is always to be seen—we are well acquainted with them all.

The garrison of India prides itself on the practical nature of its training, and that ample facilities exist for exercises of all sorts in the field cannot be denied. The ground around cantonments is in most cases available for the movement of troops for a considerable portion of the year; and even in the few instances where this is not the case ground can as a rule be found within a few marches where field training in all its branches can be carried out. The existing facilities

are beyond doubt much greater than those to be found in England or in the majority of continental countries.

I am not at present concerned with the technical training of the different arms of the service, but would offer a special plea for the more artistic working of the three arms in combination by which I mean their harmonious combination and the realisation by each arm of its duties and relations to the others with whom it is associated.

A study of the conditions of modern war makes it clear that the battles of the future will consist of a large number of locally conducted attacks working towards a common end; and further, that the more closely this end is kept in view, the greater will be the ultimate chance of success. An intelligent appreciation of the situation to make clear what has to be done, added to the power of using to the best advantage the means at their disposal, are, in general terms, what is required of the numerous subordinate commands, who are, so to speak, the pawns on the military chess board. The extent of the future battlefield will render it more than ever important to accustom leaders to act on their own initiative. A training which will fit them for this is therefore more than ever necessary.

As no man will put his trust in the power of a firearm with whose mechanism he is totally unacquainted, and with which he has not had frequent opportunities of practising; so will the ordinary leader never attain that proficiency in the field which is so essential to success, unless he has had frequent opportunities of handling a force of three arms under a variety of conditions, and thus gaining that confidence in himself which is one of the main factors in the creation of the offensive spirit, so necessary for success in war. This is so well recognised in all theoretic discussions as to amount to a platitude. Theory is not always, however, translated into practice; for while probably most commanders of units will assent to the value of practical combined training, experience teaches that they are, as a rule, so wrapt up in the training of their own unit that they can rarely find time to work with the other arms; and unless the senior officer on the spot interests himself in the matter, no further steps will be taken. Manœuvres are for some reason often unpopular in India, in spite of the many facilities which exist for carrying them out. I have neither the time nor the inclination to go into this dislike, for I am not at present concerned with manœuvres, but wish to devote attention to the ordinary so-called field-day which takes place within a radius of ten miles of cantonments. These operations are, I am aware, also unpopular with the majority of C. O's, who regard the time spent at them with a certain amount of regret and contend that their men, as a rule, learn little or nothing.

This view is due to a variety of circumstances: firstly, to inertia, that inherent quality which inclines all bodies to continue in their original state, active or passive. The infantry clings to musketry, the cavalry to riding-school and training remounts, the gunners to stables and gun drill, and all make common cause in resisting any

force which tends to remove them from their usual groove. Secondly it is due to the feeble manner in which most so-called field-days are run, when troops aimlessly wander into each others arms and the day concludes with an 18th century battle or hand-to-hand *melée*. Thirdly, to the conservative spirit of the service, which stoutly resists all innovations. They have done without practical combined training so far, and see no reason why any one should start a new fad.

These field-days have come to be regarded as purely perfunctory exercises which are generally confined to tactical examinations and produce an undesirable break in the usually smooth course of military routine. There are no doubt many excellent reasons why this form of military training is unpopular, the following are, however, some of the arguments in its favour. The reasons why it is important that officers should feel confident in themselves to control and use to the best advantage a force of the three arms has already been stated. That the subject is a neglected one, must be manifest to any one who has attended Q examinations, or had to criticise field-days.

Moreover, the reason why many senior officers endeavour to avoid the arrangement and criticism of field-days is that, having had little practice themselves, they feel disinclined to criticise and correct the actions of others, and to this perhaps is due the fact that combined exercises are rarely held, except under the direct orders of the General, and seldom or ever take place on the initiative of those in temporary command. If senior captains and majors who have not passed Q were given constant opportunities of commanding mixed forces, a general raising of the standard of leadership would result, and in time a considerable improvement would be manifest.

Again, early impressions are hard to remove, and many have not yet divested themselves of the old ideas that where one force is opposed to another, it is necessary that one of them should be pronounced the winner; in consequence the position of the umpire becomes needlessly difficult, and in many cases he ceases to be an impartial judge and is converted into a zealous partisan. Nothing can be more fatal to progress, and until all ideas of this sort are removed and the exercise treated as a purely instructional one, in which the respective leaders are called upon to make the best dispositions they can under certain given conditions, progress will be impossible.

The danger that operations conducted on these lines may become too stereotyped is at present so remote that it is hardly worth consideration. The decision of the umpire, as at cricket, must be final, and all remonstrances as to its wisdom or justice deferred till the conference, which should invariably conclude all field-days.

Exercises of the nature under discussion may be divided into three distinct phases:—(1) The search for, and, if possible, localisation of the opposing force. (2) The plan made on the information gained. (3) The execution of the plan.

Taking these in the order given, the first phase is essentially one in which the cavalry is the predominant arm.

At field-days it is usual to allow the cavalry of both sides to start quarter-of-an-hour in advance of the infantry and guns, so as to give them plenty of elbow-room. In practice the chief difficulty lies in getting back reliable information from the cavalry of a nature that will place clearly before the commander the kind of operation he will have to undertake. Such information as to the exact points on which the flanks appear to rest, the most favourable flank to attack, etc., is seldom received. The reconnaissance, being, as a rule, purposeless and without design, wastes its vigour in a few senseless skirmishes.

In this phase the umpires should devote their energies to keeping scouts within reasonable bounds and avoiding impossible situations. All scouts behaving in an absurd manner should be dismounted for a fixed period, or sent back to their main body with a message "out of action for 10 minutes." Umpires should also make notes on the handling of the arm for discussion at the conference, as without criticism there will be no progress, and officers of other arms should get a clear idea of what they may expect from their cavalry in actual practice, which differs in a vast degree from the amount they obtain credit for at staff rides.

The O.C. force presumably receives some of the information he requires from his cavalry while he is marching in the direction of the opponent, and on this he ought to be able to base his plan of attack. He accordingly issues his attack orders, which we will suppose include a flank attack, having previously ridden forward to within a reasonable distance of the reported position and made a personal reconnaissance.

When all is in readiness, he launches his attack, which brings us to phase No. 3. In this the umpires should devote their energies to keeping the opponents 600 yards apart. All troops reaching this zone should be stopped, as it is from this distance that the final assault will be launched.

Among many other points the O. C. force should devote himself to synchronising his front and flank attacks so that they are simultaneous, and to placing his guns so that while being well beyond rifle range from the position they can aid his advancing infantry up till the moment of the final assault. This is best done by placing them to the left or right rear of the infantry frontal attack, so that they have a clear field of fire. In passing, I may observe that the gunners often complain of the want of targets at field-days. Until the first opposition has been overcome and decided resistance met with, it is probable that the guns will have no targets, but the reason for their often passive attitude is to be found in the disinclination of the O. C. to separate from his guns. In the earlier stages of the fight he should leave his battery well in rear, and either accompany the O. C. force, or proceed on his own account to watch the development of the action, so that when he sees the favourable moment for action has come, he can send back for his guns and come into action without that hesitation and uncertainty which is too often apparent in the movements of this arm on these occasions,

All being now in readiness the final attack, which brings the field-day to a conclusion, can be launched.

After the first phase there is a tendency on the part of the cavalry to scatter and take no further part in the fight; this should be guarded against by collecting them with the reserve and sending a portion of them to take part in the flank attack, where they will be in a favourable position to take part in the pursuit. Union is strength, and all arms should take part in the final attack and aid one another.

The defending side will generally have to be represented by a skeleton force, but this should not prevent their planning and carrying out some form of counter-attack.

Two important precautions are absolutely necessary for the success of operations of this nature, *viz.*, secrecy, and a thorough practical knowledge of the ground to be worked over by whoever makes out the schemes. What should be aimed at is to approach as near as possible to realism, and with this object in view all information with regard to the terrain, or of strength of force taking part should be kept as secret as possible. Umpires should only receive their instructions on the evening preceding the day fixed on, and the troops should have their instructions sent to them in sealed covers, only to be opened on parade at the hour named for them to march off. The great importance of secrecy in war cannot be over-estimated, and we shall do well to practise in peace.

As one of the chief objects of operations of this kind is to practise all ranks in the study of ground, it is all-important that the officer responsible for drawing up the scheme should be thoroughly conversant with it and not rest content, as is too often the case, with simply working it out on a map. This will often involve a long ride, but will, on the other hand, insure a much better result. The work should not be confined to the staff, but each officer commanding a unit should in turn draw out a scheme for one of these combined days.

Proceedings should invariably terminate with a conference. I am well aware that they generally do, but unless they are conducted in the proper spirit very little good results. It is no use having troops out unless you intend to teach them something, for, as I have remarked before, unless there be criticism there will be no progress. The conference often takes the form of a few brief words from the senior officer, who can only have seen the operations from one side. Without unduly prolonging the day the normal procedure should not be departed from, *viz.*, that each O.C. force appreciates the situation, reads out the orders he has issued, and says how he thinks they were carried out. The chief umpires then state their opinion, clearing up any point which requires it by reference to the umpires; and finally, the officer conducting the operations sums up. By this method every officer has an opportunity of justifying his conduct, and repeated mistakes are in time eliminated.

The objection is often made that it is difficult to find time for field-days, and this objection may hold good in the early portion of

the winter when the training of units is in progress and has to claim first consideration. There is, however, a portion of the year which is in many cantonments best suited to operations of this nature, that is to say, the period between the end of spring and the beginning of summer, when the hot weather has begun, but the mornings and evenings remain cool enough for active exercise. The chief advantage of utilising this period is that the crops are all down and troops of all arms can move anywhere without doing damage. A weekly or fortnightly combined day at this season, provided it is not too prolonged, does no harm to any one.

In this matter I can speak with authority as I have experience of summers spent in some of the hottest stations in India, at one of which I am at present serving. The idea that troops should be left entirely alone during the long summer is both antiquated and senseless, but two conditions must be kept in view. The operations must be well planned and carefully arranged so as to interest those taking part, and the troops must be back in barracks by 9 A.M. The strain on the men should not be greater than that which would be put on them during the course of an ordinary parade under their own C. O.

One more point which is worth noting is the first-hand knowledge which a General acquires of those serving under him with regard to this most important branch of their profession.

There is a certain confidence bred by knowledge of the powers and limitations of the combined three arms in actual practice and how to use them on various descriptions of grounds, which neither worldly wisdom, proficiency at games, nor theoretical professional knowledge can replace.

No mention has been made of the value of these days for testing signalling, range-finding, map-reading, or regimental scouts, and of the opportunities afforded to junior officers and N.-C. O's of exercising higher commands than those to which they are accustomed.

Text-books are excellent for instilling principles, but these principles, unless intelligently applied to the different varieties of ground met with in practice, are valueless to the fighting soldier.

All training should have an end in view. It is useless to have well trained units commanded by good regimental officers who take little interest in, or have no sympathy with, the other arms of the service. In war time, at any rate, promotion is quick; and an officer who has neither sought, nor had offered him, chances of commanding mixed forces in peace, will certainly be placed at a considerable disadvantage when his turn comes to do so. It is given to few men to be born leaders, and practice and experience in such matters as ground, communications in the field, timing of attacks, and the general planning and execution of simple operations, cannot but have a beneficial effect. When we compare the utility of a day spent in ordinary cantonment routine with one spent in practical work in the country the balance of useful work done should be very much in favour of the latter.

Without self-confidence, that most essential quality, which creates a desire for offensive action, a leader will vacillate at the decisive moment through uncertainty in himself and in the powers of his troops.

A staff ride is merely a test of application and intelligence, while character and will power have much more scope in an operation where the frictions of human life make themselves unmistakably felt. And so it is that a man who has experienced the difficulties of command will probably be a much more intelligent and sympathetic subordinate.

To make clear the class of tactical exercise advocated, I will recapitulate :

1. The scheme to be drawn up by a staff officer, or O. C. of a unit, who has previously made a close examination of the ground.

2. Forces to be commanded by the most senior officers who have not passed Q., who will write orders and be tested as for examination.

3. Umpires to be selected from those officers who have passed Q. 2. They must make notes and give their appreciations of the situation at the conference.

4. Each operation to be divided into distinct phases, which it is the umpire's business to create.

5. Operations to terminate with a conference attended by all officers, at which the operations are discussed on the spot ; and a short summary of the day's operations to be circulated with the following day's orders.

The importance of practical combined training in the field, the difficulties which have at present to be faced in carrying it out in India, and its claims to a higher place than that assigned to it in the present curriculum of military education ; these are the main points I have endeavoured to deal with in the above paper.

At present a certain number of candidates who present themselves for Q. (2) examination have never commanded a force of the three arms in their lives. A rule that every officer presenting himself for Q. (2) should show a certificate that he had commanded a mixed force at least three, and if possible, six times previous to his examination would both save the time of the Boards and improve the standard of the examination.

I am quite prepared for the remark that well conducted manœuvres, on service conditions, may be excellent, but that field-days of the description advocated are of little real value. Where ground and climatic conditions are favourable, as in the vicinity of Quetta, for instance, there is no doubt that manœuvres are the best training for actual war that can be found. In the majority of Indian stations in the plains, however, where famine, want of funds, autumnal sickness, winter rains, crops, and plague, all in turn, and sometimes in combination, stand in the way of annual manœuvres, unless the combined training of the troops is to be disregarded, recourse must be had to the best substitute that can be provided,

the station field-day, or as I would prefer to call it the combined training day. In England excellent instruction is given in this form with nothing like the facilities for ground which exist in most stations in India. There is more keenness, the umpiring is more thorough, and the conference is more carefully conducted.

The infantry tests have done much to insure a uniform and practical system of inspection in the Indian Army. Are we not prepared to advance still further in this direction by testing our officers in a more methodical manner and giving them more opportunities of commanding mixed forces than they at present receive? The old style of haphazard field-day must disappear and be replaced by a carefully planned, well conducted, and impartially criticised combined tactical exercise, which should have for its object not only the instruction of officers in the handling of the three arms in combination, but also the teaching of the more senior ones to produce by their efforts those realistic situations so necessary for sound instruction, and the art of intelligently criticising operations.

Officers trained on these lines will gain confidence in themselves—a confidence which must in time give birth to that offensive spirit without which no army can achieve great results *

* NOTE.— Since writing the above I have read in the German Official Account of the Russo-Japanese War the following criticism on the training of the Russian Army previous to the opening of the campaign: "Co-operation between the various arms was altogether poorly developed." Are the steps we are taking in our army such as would free us from a like censure.—J. L. K.

NOTES ON AERONAUTICS.

BY CAPTAIN W. M. ST. G. KIRKE, R. G. A.

PART III.

The Military value of Flying Machines as they exist at the present time.

I.—LIGHTER THAN AIR MACHINES.

BALLOONS.

Strictly speaking, it is perhaps hardly correct to call a balloon a machine. It is, however, the only aerial device which has any "war form," or which, with the exception of kites, our Field Service Regulations officially recognise.

The performances of balloons in the past are matters of history. Only last year the Spaniards found them of the greatest use in their operations against the Riffs round Mellila.

Hitherto, however, they have not been exposed to two dangers which must inevitably discount their future utility, *viz.*, flying machines and artillery specially designed for their destruction.

Though want of space prevents any recapitulation here, the past history of balloons is of interest as showing the kind of assistance which flying machines may afford in the future. The importance of aerial observation has been proved up to the hilt, and is likely to increase, although the value of balloons as a means of making it may have reached the vanishing point in modern warfare.

Let us examine the capabilities of a balloon. Provided it can be kept in the air, it has many obvious advantages, not the least of which is that it enables that continuous reconnaissance to be made during an action to which F. S. Regulations rightly attaches such importance.

Further, its observations can almost instantaneously be transmitted by telephone. The question is, under modern conditions, can it be kept in the air? Any wind seriously increases the difficulty of accurate observation, and at a speed of 25 miles per hour it becomes practically impossible, and a kite must be used. In a wind of 20 miles per hour, a height of 1,200 to 1,500 feet cannot be exceeded.

It may, I think, be assumed, that an aeroplane can even now manœuvre in any weather which can be faced by a captive balloon. Here then is its first potential enemy, and one which should debar it from being of any use with an advanced guard, which is one of the rôles assigned to it in our F. S. Regulations.

Its next enemy is terrestrial artillery. In our Field Artillery Training we find the following:—

"Action against captive balloons and kites does not present any great difficulties, and experience has shown that the former can be

brought down and the latter rendered unsafe for the occupant after a comparatively short period.' It goes on to say, however, that the trail will probably require digging in, and that a flank observer must be consulted between each round. If, under these circumstances, it is a fact that a balloon can be brought down up to three miles by field guns, and up to four miles by siege guns, what possible chance could it have against a special equipment requiring none of these accessories, such as the modern balloon gun?

An account of some experiments recently conducted at Meppen, may be of interest as showing the capabilities of these new balloon guns. The targets were spherical balloons about 12 feet in diameter and distant about 2,000 yards. The cable was 1,500 feet long, and the wind so violent that the balloon was tossed about between 200 feet and the ground. The day was misty, but the balloons were brought down at the fifth and eleventh shots. The same report states that the trajectory of the tracer shell could, on a clear day, be observed up to 15,000 yards, whilst the maximum height of its trajectory is 30,000 feet. At 11,000 yards it can reach a height of over 4,000 feet. These figures are for the 10·5 cm. pivot-mounting gun. The range of the siege or automobile gun is 11,000, and of the field gun 9,500 yards. In the most favourable circumstances it is considered that a balloon cannot reconnoitre beyond 7 miles or about 12,000 yards, and it cannot rise above 3,500 feet. To make useful tactical observations, therefore, it will almost always be forced to take a certain amount of risk. To carry out the only remaining rôle assigned to it in F. S. Regulations, *viz.*, the direction of artillery fire, it must approach to ranges at which its destruction is almost a certainty.

However useful therefore the captive balloon may still prove against irregulars, it has received its *quietenus* as an instrument of modern warfare, and our Field Service Regulations must, on this point, be considered out of date.

DIRIGIBLES.

From a constructional point of view, dirigibles are usually placed in three classes, *viz.* :—

- (1) Rigid, such as the Zeppelins, and our Vickers-Maxim naval dirigible.
- (2) Semi-rigid, such as the Lebaudy, or Grosse.
- (3) Collapsible, such as the Clement-Bayard, Parseval, or the British "Beta."

From the military standpoint, these distinctions are of little value. A collapsible, for instance, may be of such a size, that the difficulties of inflating it render it almost as unwieldy as a rigid airship. A far better classification from a military point of view is that of size, *viz.* :—

- (1) Undeatable.
- (2) Easily defeatable.

The head resistance of a dirigible does not increase in proportion to the cubic content. Consequently the larger the vessel, the

higher its efficiency, i.e., its speed and radius of action increase, it can manœuvre in stronger winds, and by reason of its greater lifting-power it can rise to greater heights. Any vessel, therefore, which may be exposed to the attacks of hostile airships must be of a size which will only be limited by two considerations, which we will discuss later, viz. :—

(1) The difficulty of ensuring its safety when on the ground.

(2) The difficulty of starting and landing.

We have already arrived at vessels whose size, apart from their construction, renders frequent deflation out of the question. To fill the French Clement-Bayard, for instance, over 130 tons of zinc and sulphuric acid are required, or over 50 waggon-loads of compressed hydrogen. The larger Zeppelins would want nearly double that amount. Neither can be anchored with safety in the open. Quite recently a disastrous attempt was made to do so with Zeppelin II. It is safe to say that no means of anchoring these huge vessels in the open will ever be evolved. Their construction must be so light that even if the anchorage held, something would have to give under the enormous wind-pressure.

This means the provision of a dock in all circumstances and introduces a considerable complication into their employment with a field army. The Germans recognise this and rightly consider that in view of the weights involved, a large airship can only be used in conjunction with a railway.

To turn to the employment of dirigibles. Leaving out of consideration ships, arsenals, etc., which hardly concern us except in connection with coast defence, it seems improbable that airships will be usefully employed in dropping bombs. With the possible exception of hostile dirigibles there is nothing accompanying a field army of sufficient importance to justify the risks attendant on a descent to heights from which accurate practice could be made.

Enterprises against points on the enemies' lines of communication are sometimes suggested as being feasible, but their success would, I think, be very doubtful. Their effect, when conducted by cavalry, has been largely due to the uncertainty as to the numbers employed, but every one knows the number which an airship can carry. It must also be remembered that its crew cannot bring an airship to the ground or start again without assistance. Methodical demolitions of railway tunnels, etc., are therefore out of the question. Any point of vital importance could be adequately guarded by one balloon gun.

It follows, therefore, that reconnaissance and reconnaissance alone must be their *raison d'être*.

With regard to strategic reconnaissance, the radius of action of the larger dirigibles is not less than 500 miles. If it is remembered that practically the whole of the Northern French and Belgian coast can be reached from England under 200 miles, it is clear that in certain eventualities dirigibles might be of assistance in carrying out reconnaissance before a landing was effected, and more particularly

in selecting a landing point. This, however, more nearly concerns the navy than ourselves. Usually we should be fighting in alliance with a continental nation, and assuming a landing to have been effected, there would be no difficulty in placing any available dirigible, however big, with its shed and hydrogen plant in the area of strategic deployment. The essential factor is, of course, the command of the sea, for which the command of the air is no substitute. It will then occupy a position analogous to that which French and German vessels habitually occupy in peace time.

In these circumstances, the difficulties in connection with the employment of the largest dirigibles, *viz.*, housing and launching, can be adequately dealt with, and practically disappear.

Given the conditions, therefore, under which strategic reconnaissance is usually conducted, there would seem to be almost no limit to the size of the vessel which might be employed, except the very important one of expense.

We will now consider the dangers to which an airship is exposed. Weather is the greatest of all dangers which a dirigible may be called upon to encounter. The numerous disasters which have occurred, have made this self-evident, though doubtless many of the accidents have been due primarily to defects in construction and handling. The advocates of one type hail any disaster to either of the others as proof of the soundness of their views. After the accident to the République, public opinion was strongly in favour of the rigid Zeppelin type. Now that 5 out of 7 of these latter have been destroyed, the pendulum is swinging back towards the collapsibles. The truth seems to be that the lighter than air machine is, and never can be anything but, a "fair-weather vessel." If this is true, then they can never hope to compete commercially with the established means of conveyance.

Under favourable conditions, however, they have proved their efficiency; a continuance of bad weather during the whole period of strategic deployment, however short, is uncertain, and to rely on it is therefore unreasonable. The man in the street is far too fond of quoting the fate of the Spanish Armada.

With regard to the second danger to which an airship is exposed, *viz.*, rifle and artillery fire from the ground, it has been proved by experiment that rifle fire has little or no effect in destroying the gas-holding properties of the envelope, owing to the enormous tension under which the fabric is placed by the pressure of the gas.

At an altitude of three thousand feet, a balloon is safe from field artillery fire at all ranges. In any case, shrapnel fire is but little, if any, more effective than rifle fire, though the introduction of chained bullets might increase the effect.

Under conditions favourable to the dirigible, its speed, combined with alterations in altitude, would render it an extremely difficult target, even for a balloon gun. If, however, it could be caught when beating up against a stiff wind, it would be a comparatively easy victim. A certain number of these guns are therefore necessary with

the field army to enable such opportunities to be taken, but the number should be reduced to the absolute minimum.

A Frenchman, writing in the typically vague way in which this subject is often treated, advocates the following:—

"To render dirigibles inoffensive, it will suffice to distribute a proper number of suitable guns among the principle passages, that is to say, upon the principal points of disembarkation in the vicinity and on the coast, the principal passages of rivers, their mouths, and the principal locks of all great routes of navigation, the strong points, the bases of merchantmen and navy, important military establishments, etc."

This leaves us in uncertainty as to whether 10, 100, or 1,000 guns are required; but one thing is quite clear, and that is, that the suggestion involves passive defence in its most virulent form. To keep hundreds of men and guns scattered about the country waiting for an enemy who may never come, and whom they will probably miss when he does come, is opposed to our ideas. In the end it would prove far more costly and certainly less effective than the obvious antidote, which I need hardly say is "other airships."

This brings us to the question as to how airships can destroy each other. Up to date dirigibles have been fully employed in flying, and means for mutual destruction have hardly emerged beyond the discussion stage. Colonel Capper advocates light artillery, whilst there is a small aerial torpedo, of very doubtful utility, somewhat on the lines of the Brennan torpedo but controlled by wireless, now being demonstrated in London. Whatever the armament ultimately selected, it is obvious that the ship which gets above its enemy will have gained what, in the days of sailing ships, was called the "weathervane."

Other things being equal, this position will be secured by the vessel having the superior speed and power to rise, both of which, as previously explained, depend on actual size. In a European war, where both sides are equipped with airships, victory should rest with the side which has the bigger ones. This is the idea on which the Germans have been working, as opposed to the French, who have been building a smaller type.

Recent manœuvres on the continent have demonstrated beyond a shadow of doubt that the side holding command of the air has an overwhelming advantage. In the earlier stages of the campaign at the present moment it is by dirigibles that this will be secured. To be of any use, however, these must be of large size and powerful type.

If it is admitted that strategic reconnaissance can be effectively carried out by dirigibles, the question naturally arises, why have any strategic cavalry? Could it not be abolished and the money spent on airships?

The answer of course is, that, though airships may discover the enemy's intentions, they can do nothing to interfere with them, nor can they secure us from interruption. It is hoped that our cavalry

may do both. Further, we must keep on land any advantage gained in the air. Lastly, the weather factor must not be lost sight of. In these days of rapid mobilization, to trust entirely to airships would be no more reasonable than entirely to neglect them.

For tactical reconnaissance the French advocate a small portable vessel, which they call a "scout," in contradistinction to the larger "cruiser" type which we have already discussed.

One may well imagine that a small handy vessel, capable of being easily inflated or deflated, would be a most useful adjunct to a field army. One can picture it accompanying an advanced guard, finding out the flanks of an enemy's line, detecting his false front, or locating the position of his most carefully concealed guns; in fact absolutely nullifying all his attempts at surprise in any form.

Our latest army dirigibles are of this type, but one must not therefore jump to the conclusion that it is the one favoured by our expert advisers. In designing them, it is quite probable that Colonel Capper was forced to cut his coat to suit his cloth, and as a means of training *personnel*, they should prove most valuable. More important still, they may impress the British public with the very real possibilities of aerial reconnaissance, and so remove the great obstacle with which the Balloon Establishment have had to contend, *viz.*, "British conservatism."

In war, however, a vessel of this type would, I believe, even now prove practically useless. With a maximum speed of only 20 to 25 miles per hour, and a possible altitude of only 3,000 to 4,000 feet, it could only venture out in the finest weather, and could neither hope to survive hostile artillery fire, or to escape from hostile aeroplanes. Small though it is to fill it, some 17 waggon-loads of compressed hydrogen, or over 30 tons of material, would be necessary. If, however, the size is increased so as to attain a height of 5,000 feet and a speed of 30 to 40 miles per hour, which may be taken as the absolute minimum even in the present state of aeroplane development, then the question of hydrogen becomes a very serious one. The Germans are experimenting with liquid hydrogen convertible into gas electrically, but to what extent this method may solve the difficulty, is at present unknown.

The alternative is to carry a portable shed, taking some 48 hours to erect, so that the dirigible may be housed fully inflated. In either case a railway is necessary, but even if available, to say that it solves the difficulty is to leave the aeroplane out of consideration. A balloon shed or "hangar," as it is called, would be a fairly prominent feature in any landscape, and if located by day, could hardly be protected by night against aeroplanes carrying small bombs. Its best chance would be concealment amongst houses or trees, and one can well imagine circumstances under which this might not be feasible. It might, of course, be equipped with overhead torpedo netting, but this would still further complicate matters. Failing that, the balloon would have to be kept at such a distance in the rear that its utility would be seriously discounted.

The whole question is largely one of opinion, but it seems quite probable that for tactical purposes the small dirigible will prove too easily destructible in the air, whilst the large one will be equally vulnerable on the ground.

The difficulties in the employment of dirigibles which exist even now, are likely to increase with every improvement in aeroplanes, and must result in their ultimate supersession in the field by the latter.

To judge how far the process has already gone, we must consider the performances of the present aeroplane.

II.—AEROPLANES.

In December last, Colonel Capper gave it as his opinion that "The aeroplane, as at present evolved, is of but little use in war. It can be used for carrying, in our own country, despatches, maps, etc., with speed and certainty, in fair weather. It may even carry single passengers from point to point, but it is not yet useful either for reconnaissance or for offence." Elsewhere, however, he qualifies this by saying, "As soon, and the time is close upon us, as the aeroplane shows itself capable of raising two men in any ordinary weather, to a height of 3,000 feet and of undertaking journeys of 50 to 100 miles with fair certainty, I think that as a mere military precaution we shall be obliged to maintain a considerable number of these vessels and train large numbers of men to fly and fight them."

The last six months have considerably altered German opinion as seen in their decision to discontinue the construction of further dirigibles for the present, and to acquire aeroplanes.

It would be interesting to know to what extent in the same time Colonel Capper has modified his views as expressed in the first quotation, in favour of the second.

In considering the aeroplane, as at present in use, it must be remembered that it has been evolved by private enterprise for private individuals. The ordinary man, whatever he may do later, does not at present want to fly about the country *en famille*. He wants a handy, easily-housed, portable, and reasonably cheap machine. He also wants to go as fast as is consonant with the above, partly because it is safer, and partly because nearly all the prizes are for long or fast flights. As a rule, he has no particular desire to fly high, because the wind usually increases with the altitude. Manufacturers naturally cater for the wants of their customers, and if they were to depend on Government for their orders, they would probably starve. As a result, no aeroplane designed specially for military use has yet been tried, or if tried the results have been kept secret, and we have only the performances of small pleasure machines on which to form an estimate of their value. These after all are very considerable. Their speed usually reaches 50 miles per hour. They can rise off any level ground in 50 yards on an average, and at Pau the prize was won with a start in 13 yards. Lately this record has

been reduced to 8 yards. From Chalons to Dijon, 130 miles, has been flown with a passenger without a stop. Quite recently two French officers flew 100 miles, in 150 minutes on one of the Government machines, one steering, whilst the other took photographs, but they did not rise above 500 feet. At Los Angeles, Paulhan reached a height of over 4,000 feet, and if it was made worth his while, there is little doubt that he could go considerably higher*.

Under the influence of great excitement, men will run great risks, as was shown when Grahame-White started after Paulhan in pitch darkness over invisible telegraph wires. In war, when danger is everywhere, such risks will be taken naturally, and as a matter of course. It is probable therefore that there are unexplored possibilities in the present aeroplane which do not exist in the case of the "dirigible." In flying at great heights there is no doubt a loss of efficiency in both motor, propeller, and sustaining medium. If, however, flights can be made at St. Moritz and Salt Lake City, both over 4,000 feet above sea level, the difficulty is obviously not insurmountable. Only the larger dirigibles could have risen at these altitudes. That alone seems proof positive that the larger aeroplanes will force the large dirigible either to leave the air or to manoeuvre at heights at which any observations it may make will be valueless.

Increase in size is theoretically far more favourable to aeroplanes than to dirigibles. Every horse-power put into a machine will carry considerably more than its own weight.

It has been calculated that the engine-power of a destroyer would be sufficient to sustain it in the air. That the idea is thought to be a practical one is shown by the report that Germany is building several large aeroplanes, one with six super-imposed planes being designed to carry no less than ten men.

To return to the actual machines in use, first let us consider to what extent they can assist us in war.

With regard to strategic reconnaissance, the first duty for which we hope to use a flying machine is reconnaissance for a landing in an enemy's country.

Up to date no satisfactory means of launching a touring aeroplane from a ship has been invented. Not that the difficulty is likely to prove an insuperable one, so much as that the civilian has no particular object in tackling it. Once launched, however, without more latitude in speed than is at present possessed, it is difficult to see how it could re-align on boardship. A footing on the coast is therefore essential to start with.

With regard to radius of action, flights of 100 miles are comparatively common, and in consideration of the more favourable weather conditions which usually prevail on the continent, it is thought that a flight of 50 miles could be relied upon on four days out of the seven.

* Since the above was written several flights of over 6,000 feet have been made, and, at Deauville, Morane is reported to have reached 8,460 feet.—EDITOR.

The above is hardly sufficient for strategic reconnaissance, except in conjunction with cavalry, with which they should prove invaluable, both as scouts and as agents for the destruction of hostile dirigibles.

Under favourable conditions, it seems possible that the addition of aeroplanes may effect a great saving in horseflesh in the transmission of intelligence, and also enable cavalry to manœuvre in more concentrated formations from the outset than is at present possible. Until, however, improvements in design render them less dependent on fine weather, no great modification in the training of the cavalry arm need be anticipated, though the question may have to be faced in the future. The recent performances of aeroplanes in the German manœuvres tend to show that they might effect material damage by dropping bombs at night and so stampeding the horses.

Colonel Capper in his lecture, gave it as his opinion, that "aeroplanes will be no assistance to artillery." The French War Minister, on the other hand, has decided that "a number of aeroplanes shall be turned over to the field artillery, on account of the special value which these machines offer for the observation and adjustment of artillery fire."

At first sight these two authorities seem diametrically opposed to each other. If, however, one remembers the difference in the methods of engaging targets employed by ourselves and the French, they are not so conflicting as might be supposed.

Colonel Capper was doubtless referring to the exact system of ranging siege artillery, as conducted from captive balloons and kites, for which a stationary platform and rapid communication with the guns are essential. What the French require to know is, whether a certain area is or is not occupied by the enemy, trusting for effect to "sweeping" and "searching."

Taking for example, the artillery fight at Ta-shih-chiao, it seems probable that in locating the position of the concealed Russian guns, and in roughly correcting fire on to them, an aeroplane might have been of the greatest possible assistance.

If, as seems possible, the present aeroplane is efficient for this work, the protective power of the concealed position for artillery will be considerably discounted.

The most important duty which an aeroplane can hope to perform is that of tactical reconnaissance.

The invulnerability which it enjoys, is a great factor in its favour. It can manœuvre comparatively close to the ground with but little fear of injury from gun or rifle fire. The chances of hitting the engine or pilot at a height of 2,000 feet are little more than those of bringing down a sea gull with a rifle at 200: either might be called a fluke. By night the aeroplane is absolutely safe.

Any information acquired can be brought back so rapidly, that the question of whether it can or cannot be fitted with "wireless" is of minor importance*.

* It is reported that in America wireless messages have been sent by and received from an aeroplane manœuvring at a height of 500 feet.—W. ST. J. K.

The case with which it can be moved renders it particularly suitable for use with an advanced guard. One of the experimental German machines is designed for use either on a road or in the air. Whether it is successful in this dual capacity is at present unknown. In any case, future ones probably will be.

If supplemented by "kites," an observer could be got up into the air in any weather.

We will now turn to the obstacles to the use of aeroplanes.

Both aeroplanes and dirigibles can be used in winds almost up to their own speeds, but as the aeroplane will always far surpass the dirigible in speed, it must have the advantage in this respect.

Pending the solution of the problem of "automatic stability" for aeroplanes, however, their manipulation in strong winds requires great skill. At the present moment, therefore, in ordinary hands, both require favourable weather, and there is little to choose between them in this respect. Where the aeroplane scores so enormously is in portability and invulnerability. That the inherent stability of aeroplanes is rapidly increasing is shown by the fact that after 20 minutes practice on the ground, a beginner recently took a Short Biplane 10 miles on a circular course. It is also reported that the Dunn aeroplane is truly stable; but this is open to doubt.

The following difficulties are inherent in the machines themselves:—

(1) *Starting*.—To start in the smallest space, it is necessary for the machine to be held until the propeller is rotating at its maximum. The speed necessary to lift, *viz.*, about 35 miles per hour, will then be obtained in the shortest distance. A device to enable the pilot to start by himself has been patented, but, naturally enough, the civilian never uses it. Why should he? In any case, the operation is child's play to starting a dirigible, though the difficulty would doubtless increase with the size.

(2) *Engine trouble*.—The most frequent cause of descent is some fault in the engine. These can generally be traced to defective lubrication or cooling, and in any case, can be traced to the excessive lightness of the whole. This in turn is necessitated by the small weight of the whole machine, and would largely disappear with increased size.

(3) *Accidents*.—Nearly all the fatal accidents have been caused by collapse of the main supporting planes, due either to some structural fault or more frequently to the installation of a more powerful motor than the machine was originally designed for, in order to win speed prizes. This is a passing phase, and would hardly affect a military machine.

It is generally agreed that the only sure way to destroy the enemy's aeroplanes, is to have a larger number of one's own, of an equal or superior type. Their armament, however, has not yet been seriously considered, though it is stated that the French have mounted a machine-gun on one of their Antoinette monoplanes.

Obviously until the man to work it can be carried more efficiently than at present, the question is of minor importance*. There should, however, be no difficulty in carrying small grenades for use against dirigibles, etc. The ease and accuracy with which bombs can be dropped at night has been demonstrated in the German manoeuvres.

Should the hostile dirigibles have escaped the attentions of the aeroplanes with the strategic cavalry, they will form the primary objective of at least a portion of those with the advanced guard.

KITES.

If dirigibles and aeroplanes are at present only fair-weather contrivances, the kite is, *par excellence*, a bad-weather device, and is therefore likely to be of continued use in the future.

It can only be used in winds of 25 miles per hour and upwards, and practically the stronger the wind, the better.

For tactical reconnaissance it must remain the standby in bad weather. It is, however, lacking in the offensive power possessed by the aeroplane.

CONCLUSION.

In conclusion there can be no two opinions as to the utility of aerial reconnaissance. The commander who is without some device for carrying it out will be absolutely paralysed. His only chance of effecting anything in the way of surprise will be to utilise spells of weather so bad as seriously to hamper the success of his projected operations.

Generally speaking, since surprise is a stronger weapon in the hands of the attack than in those of the defence, aerial reconnaissance favours the latter.

An offensive on land must be preceded by similar action in the air, or it will probably fail.

To compensate for loss of the command of the air, recourse to night operations is likely to be more frequent than ever. Let us hope that we may be in a position to attain it.

It only remains to consider what are our immediate requirements if this object, command of the air, is to be attained.

(1) For strategic, and more particularly for overseas reconnaissance, dirigibles are at present a necessity. The aeroplane will, however, gradually supersede them, and therefore, except for instructional purposes, it is waste of money to build small vessels, which if not already out of date may at any moment become so. The most powerful type alone is of any use, and a numerical superiority is equally necessary. We in England call this class "Naval" airships.

From our geographical situation it is clear that naval operations must precede any offensive military action. The latter only become feasible when our fleet has gained a marked superiority.

If we possessed a powerful fleet of naval airships, they would then become available for land operations, and would meet all our requirements.

* The Breguet and Farman biplanes have both carried four men, so this difficulty now seems in a fair way to be solved.—W. Sr. G. K.

(2) Given dirigibles, the second necessity is the provision of portable sheds for installation in the area of strategic deployment.

(3) The third necessity is the addition of balloon guns to our artillery, to enable us to make the most of such opportunities for destroying hostile airships as the weather may afford us.

(4) From a military point of view, perhaps the most important of all is the immediate provision of aeroplanes for coast defence, raids on hostile airship docks, for use with strategic cavalry, and for every kind of tactical reconnaissance.

Even assuming that the present machine is only in an embryo stage of development, the training of the *personnel* alone would fully justify the small expense of purchasing a dozen for instructional purposes. Every nation except ourselves has acquired aeroplanes and detailed officers to learn on them. We possess one only, which was presented by a civilian, and is now out of date. Such British officers as can fly have learnt at their own expense, and, having learnt, sufficient inducements to remain in the service are apparently not held out to them.

(5) At the same time the ultimate success of the aeroplane is beyond doubt, and therefore Government should take steps to evolve a machine more suited to military requirements. The cheapest way to do so would probably be to guarantee to purchase on liberal terms 12 machines of the first type which complied with their specification.

(6) Lastly, the provision of *personnel* must be considered. The German Aerial League quite rightly put this in the forefront of their programme, and the British Aerial League is collecting subscriptions with a similar object.

If aerial warfare assumes the importance which many think, it will become a service separate from either the army or navy, and the objection to using the same dirigibles for both will disappear. This is perhaps looking too far ahead, possibly to a time when the dirigible has ceased to exist. For the present, special terms might be offered to the class which provides most of the continental aviators, *viz.*, the professional motor drivers, with a view to inducing them to enlist. To the corps so formed, might be added a special Territorial Reserve, in order to utilise the services of such civilian pilots as we already possess.

The above no doubt means considerable expenditure, but if Italy can afford £400,000, surely we can do so too. If we know our own minds, we certainly can.

Up to date we have been sitting on the fence between the dirigible and the aeroplane. Leaving the dirigible to the navy, the army should come down, and come down with decision, on the side of the aeroplane. Until the decision is made, there is little hope that the necessary funds will be forthcoming.

ARTILLERY POSITIONS ON THE BATTLEFIELD.

BY MAJOR K. K. KNAPP, R.A.

Though the expression "Artillery duel" has completely disappeared from our text-books of training and no reference to the fight between the opposing artilleries will be found in the description of an attack in F. S. Regulations, it is wrong to suppose that artillery will only incidentally be called upon to fire upon artillery in the fighting of the future.

It is true that a general artillery engagement will no longer precede the infantry advance as a separate phase of the fight, a tactical misuse of artillery which found favour for a time and of which our operations in South Africa afford some noteworthy examples; but the artillery duel must inevitably take place at some stage of and in conjunction with the infantry attack, and until superiority of fire is established over the hostile artillery or the progress of the infantry attack is stopped by the effective rifle fire of the enemy, the objective of the bulk of the attacker's artillery must be the enemy's guns, if it is to perform effectively its function of assisting the other arms to break down hostile opposition.

As General Langlois says, "the increased importance of artillery fire in opening the way for the infantry has, as a corollary, the increased necessity of silencing the enemy's artillery as soon and as completely as possible."

It will be none the less the chief duty of the artillery in the final and decisive stages of the attack to assist the attacking infantry in establishing superiority of fire over the hostile infantry and to prepare the way for the final assault, and the attacking artillery will be the better able to do this with effect if it has previously gained some superiority over the enemy's artillery in the artillery duel.

Therefore the necessity for engaging the hostile artillery at the earliest moment with the greatest possible effect must be the guiding factor to the attacking artillery in determining the nature of range at which fire should be opened, and in the choice of positions and method of their occupation.

Before discussing the question of artillery positions in this duel, it is necessary to consider how the long-ranging powers of Q.-F. field artillery can best be utilised for offensive purposes; for the ranges at which artillery opens fire must necessarily have much bearing upon the choice of positions.

The Q.-F. gun, with which our field artillery is now equipped, ranges up to and over 7,000 yards, and shrapnel fire is only limited to 6,000 yards for want of a longer burning fuze. So it is easy to realise what a temptation this will be to commanders to bring their artillery into action in initial positions at distant ranges. But the experience of war and results of practice-camp shooting teach us

that distant fire entails the expenditure of much ammunition for very little result, and as the expenditure of ammunition with Q.-F. artillery will be a serious consideration in the battles of the future, it will very rarely be sound tactics to open fire at distant ranges.

This view is corroborated by Russian artillery officers, as the following extracts from the Russian Artillery Journal "Notes on the Tactics of the War, 1904-05" show:—

"At the first flush one might make the following deductions from the experiences of the campaign: 'Artillery ranges have enormously increased as compared with the past' * * *. With all due respect to the teachings of war, we must strongly protest against such conclusions as these, which we believe to be totally false and which, if accepted, would inevitably lead artillery into a wrong and perilous path."

"We have no hesitation in saying that the craze upon both sides for long-range fire was a tactical mistake, which had very detrimental results."

"Q.-F. artillery must take positions within decisive shrapnel range (2,300—4,600 yards) and must strive to obtain decisive results quickly. As a general rule, to engage at long range is aimless and desultory and leads to useless expenditure of ammunition."

These strong views are based on actual and recent war experience with Q.-F. guns, and must therefore carry considerable weight. The Germans, too, are no friends of long-range fire, as their field regulations show; and General Langlois is quite definite in his opinion. He says, "It is unwise to count on the effects of fear a long way off. When troops recognise that they are only frightened by a bogey, the effects disappear, and the men often gain in confidence, which increases their *moral*."

To come nearer home, Major Budworth, who speaks from much experience of artillery practice camps, expressed the opinion in a recent lecture on "The Tactical Employment of Artillery, etc.," that "the positions first occupied should be as near the enemy as possible," and he talked of "the sound theory that artillery fire must not be opened at distant ranges."

We may therefore accept the conclusion that the initial positions of artillery should not be at distant ranges.

Unfortunately, however, there is reason to fear that in our army the idea finds ready acceptance that, notwithstanding sound theory, distant artillery fire will be a feature of the battles of the future. This feeling is given expression to by Major Budworth in the lecture above quoted, when he qualifies the sound principle which he first enunciates, by saying "yet true as this is, we may safely conclude from past history that artillery fire will be opened at distant ranges, and these ranges will have a tendency to increase," and he puts this still more forcibly in a subsequent lecture on "Artillery in co-operation with Infantry" by saying "Theory or no theory, from compulsion or choice, artillery fire is bound to take place at very distant ranges."

But we surely must not accept these conclusions, considering the weight of evidence against the use of distant artillery fire. Rather should we combat any tendency to run counter to sound theory and endeavour to inculcate the principle, whether at manœuvres or on the practice ground, that "first positions should be as near the enemy as possible." Sound training in peace-time is the basis of good leading in war, and there will be little likelihood of commanders resorting to distant artillery fire on the battlefield if they have learnt on the training ground to regard it as unprofitable expenditure of ammunition.

To this end, all reference to distant fire should be eliminated from the text-books of training (c. p. Field Artillery Training, p. 216, and F. S. Regulations—Operations—p. 14), and the fact should be emphasised that the increasing power of artillery does not lie in the ability to fire at distant ranges, but in the increase of range at which effective or decisive fire can be delivered, in the greater rate of fire which can be developed, and in the feasibility, which longer-ranging powers give, of concentrating the fire of dispersed batteries without change of position, whereby oblique or enfilade fire may be brought to bear on the objective, especially in the attack of salients. And all our peace-training should be directed towards teaching that Q.-F. artillery must be tactically employed so as to utilise to the greatest advantage these increased powers of effect.

The question of artillery positions on the battlefield may then be considered from the standpoint that artillery fire must not be opened at distant ranges, and that the first positions should be as near the enemy as possible.

As "the first object of a commander, who seeks to gain the initiative in battle, is to develop superiority of fire as a preparation for the delivery of a decisive blow," it is to the advantage of the attacking force that there should be a general artillery engagement.

To obtain superiority of fire in this duel and produce result quickly, the artillery of the attacking force will endeavour from the first to come into action as near the enemy as possible, and if it can occupy positions at effective ranges, *i.e.*, within 4,000 yards, changes of position, with the attendant risk and loss of fire action, are avoided, and effect proportionate to the expenditure of ammunition may be looked for.

But ranges which are effective for the attacking artillery will be equally effective for the artillery of the force acting on the defensive, and batteries coming into action in the open at effective ranges would be at the mercy of batteries in observation, as those of the defender's artillery are certain to be. Therefore positions at effective ranges can only be occupied by the Q.-F. artillery of the attacking force at this stage of the battle, if they afford cover from the view of the enemy.

Smokeless powder, indirect fire instruments, and improved means of communication now make concealment possible without any sacrifice of accuracy of fire, if a suitable position for observation

can be found even at some distance from the battery ; and when it is of primary importance to minimise the risk of casualties among personnel, horses, and equipment, in order that batteries may retain their mobility and efficiency for the subsequent developments of battle, the advantages of complete concealment cannot be overestimated.

Other advantages of concealment, which conduce to effect and to the maintenance of steady accurate fire, are the opportunity for surprise, facility of replenishment of ammunition, and the increased difficulty that the hostile artillery experiences in locating his opponent. There is no doubt, therefore, that at this stage of the battle the attacking artillery should, if possible, come into action in concealed positions at effective ranges, in order to establish superiority over the hostile artillery as soon and as completely as possible.

But the defence has a counteracting advantage in concealment, that it can, by withholding its artillery fire, prevent the attacking artillery from locating its artillery positions in the absence of any form of aerial observation, and can thus, until compelled to open fire in self-defence, deny the enemy opportunity for a general artillery engagement.

In these circumstances, the attacking force must endeavour to draw the defender's artillery fire and compel him to disclose his position. The infantry will, therefore, be pushed forward towards the enemy's position, and under cover of their advance the batteries of Q.-F. artillery will take up their positions of observation and make all preparations to open fire when the hostile artillery is forced into action. But the close support of some batteries is essential to the infantry to assist them against hostile infantry, advanced posts, etc., or in case of local counter-attack, so that their advance may not be stopped by local opposition and the Q.-F. artillery may be left free to make their preparations for the important rôle they have to fill.

If there are no batteries of pack artillery to accompany the attacking infantry, some field howitzer batteries must be told off to accompany and support the advance, and if the ground favours the movement of wheeled artillery to close artillery ranges, then these howitzer batteries must accompany the infantry throughout the advance and closely support them to the latest possible moment in the attack. But there is no doubt that pack artillery is by the nature of its mobility the most suitable form of artillery closely to accompany infantry, and should be used wherever available. The field howitzer batteries will so be free to co-operate with the Q.-F. artillery.

The advance must further be supported by batteries of heavy artillery, which should occupy positions of observation under cover at ranges between five and six thousand yards, until the Q.-F. artillery has taken up its position, when they too should move forward to concealed positions at effective ranges to co-operate with the Q.-F. batteries in their fight for superiority with the enemy's artillery.

If, when the Q.-F. artillery is ready in positions of observation, the advance of the infantry fails to draw the fire of the hostile

batteries as soon as desirable, a judicious use of one or two decoy batteries, pushed forward into action in the open, or even in partially concealed positions, will almost certainly succeed in drawing the fire of some of the defender's artillery. This method of drawing hostile artillery fire was used by both Russian and Japanese artillery with success on more than one occasion during the war of 1904-05.

Even if only a small portion of the hostile artillery is induced to open fire from the main position, the superior fire which the attacker's artillery, till then in observation under cover, will bring to bear on it, will force other batteries to open fire in its support, and this again will draw more of the attacker's artillery into the fight and compel response from the enemy, till gradually the bulk of the defender's artillery will be committed to action. Then will the duel for superiority of fire, on which the success of the attack so much depends, be fought out between the two artilleries.

While the artillery duel proceeds, the attacking infantry continues to work its way forward, assisted by the batteries in close support, and endeavours to reach a decisive fire position from which the fight for superiority of fire with the enemy's infantry will be fought out.

The progress of the infantry will probably be very slow when they reach effective rifle range, until the Q.-F. artillery co-operates directly with them against the hostile infantry. But co-operation from long effective artillery ranges will not afford the infantry all the support that they require against hostile rifle fire. So, as soon as the attacking artillery has established superiority over the hostile artillery, or as soon as the infantry progress is stopped by the effective rifle fire of the defence, as many batteries as can be spared from the artillery contest, including all field howitzer batteries, if these are not in immediate support of the infantry, must be pushed forward to more advanced positions at decisive ranges, *i.e.*, within 2,500 yards. The rest of the Q.-F. batteries and heavy artillery will remain in their initial positions to keep control of the enemy's artillery fire, and will increase their rate of firing so that no indication of the move of the other batteries may be conveyed to the enemy by a diminution of fire.

The functions of the batteries thus pushed forward will be to co-operate in breaking down the opposition which directly impedes the infantry advance. The objective may be hostile batteries, which have been brought into forward positions to fire directly upon the advancing infantry, or hostile rifle trenches may be the more threatening to the advance; whatever it may be, the fire of these batteries must be distributed, so as to give the infantry the utmost assistance in fighting its way forward to a decisive fire position. To ensure this, communication must be established between the artillery commander and the attacking infantry, and when this is done the brigade commander of the batteries which are moving in close support of the infantry is the officer who should be responsible for sending information of the progress of the infantry. He will

himself be with the officer commanding the infantry attack and so in a position to know what is wanted.

A careful watch on the infantry progress must be kept by the Q.-F. artillery, and precautions taken to detect at once any threat of a general counter-attack. Moving targets and changes of objective will have to be dealt with, section control may have to be resorted to, and fleeting opportunities for decisive effect will not infrequently offer themselves. Positions must therefore be selected for these Q.-F. batteries, which afford facility of command, a large field of view and fire, and preferably opportunity for direct laying. Positions which afford complete concealment will no longer be suitable, and positions which are masked, *i.e.*, partially concealed, or positions in the open, must be occupied.

If partially concealed positions are not available, then undoubtedly the batteries which are pushed forward to decisive ranges must take the risk and occupy positions in the open, and if due caution is observed in the advance, and the move into action comes as a surprise to the enemy, the risk incurred will not be incommensurate with the results to be attained, provided the positions occupied are not within rifle range of the hostile infantry, and superiority of artillery fire has already been established.

But the occupation of positions in the open must offer the enemy's artillery an opportunity of reopening fire with telling effect, even if it has been temporarily driven to silence; and if masked positions are available—and the occasions will be rare when accidents of ground do not offer opportunity for partial concealment of batteries at decisive ranges—there is no question that these should be occupied in preference to positions in the open. For they offer considerable protection to batteries both when coming into and when in action, and replenishment of ammunition and replacement of casualties are facilitated behind cover.

When the decisive fire position is reached by the attacking infantry, and the fight for superiority of fire with the hostile infantry takes place, the Q.-F. batteries at decisive ranges and the heavy artillery from their position at effective ranges must concentrate their fire on the part of the enemy's position selected for assault, which is possible without change of position and pregnant with effect on account of the increased ranging powers of the artillery.

Nothing will be gained by a forward move of the Q.-F. batteries from these decisive positions until the assault succeeds.

During the final and decisive stage of the attack, *i.e.*, during the progress by rushes of the attacking infantry from the decisive fire position to a position so near the enemy's position that the advance from there culminates in the actual assault, the fire of these Q.-F. and all other batteries which are shelling the place selected for assault, will be delivered in sharp bursts to cover each succeeding impulse of the attacking troops from the rear, until the difficulty of distinguishing their own from the hostile infantry makes an increase of range and fuze imperative.

If the attack is to succeed, fire must be maintained on the main position until the attacking infantry are considerably nearer the place of assault than six hundred yards, which is the distance short of the objective at which the attacking troops are said in Field Artillery Training, p. 211, to be safe from their own artillery fire. The decisive fire position of the attacking infantry is likely to be anything from five to eight hundred yards from the point of assault, and this distance cannot be crossed without the support of artillery fire. Considering the reliability of our artillery ammunition and the accuracy of our field guns at decisive ranges, and allowing for the fact that the range and fuze are likely to be known accurately to the batteries long before any forward movement of the infantry from the decisive fire position takes place, it would be better to eliminate any academic definition of the safety margin from our text-books, and lay stress on the safety of artillery firing over the heads of the attacking troops as long as it is possible to distinguish them from the enemy.

If the infantry are taught in peace-time that we do not consider them safe from our shell fire within six hundred yards of the objective on the level, and how else can they read F. A. T. p. 211, then the decisive attack is likely to suffer for want of impetus, when dash alone will ensure success.

If the assault succeeds some artillery must be pushed forward to the position taken, to assist the successful infantry, and the batteries which are in close support, against any offensive return of the enemy. If on the other hand the assault fails, these batteries will, from their position at decisive ranges, be able to offer effectual aid in covering the withdrawal of the retiring infantry and checking the pursuit of the enemy. In the latter contingency, the cover which a partially concealed position affords will prove of incalculable value in preventing these Q.-F. batteries from being overwhelmed by the hostile artillery, and in facilitating their subsequent withdrawal should the necessity arise.

In battles of encounter, the artillery duel will probably develop from the initial collision. The advanced guard batteries will be brought into action at once, and reinforcements of artillery will be pushed up on either side, as the armies gradually deploy for battle, so that the artillery duel will be coincident with the deployment of the armies and development of the attack. Though no deliberate preparatory arrangements are possible, the same principles will govern the tactical employment of artillery as regards ranges and positions: but success in the artillery duel must be looked for in the rapid deployment of a superior force of artillery at the decisive point, and this the initiative of commanders will alone secure.

The advantage that the defence gains from concealment, and the necessity for maintaining its artillery in a state of efficiency to assist in repelling the decisive attack and take part in the counter-attack, leave the defending artillery no choice but to occupy concealed positions, whenever possible, in the early stages of the attack. And

the selection of these positions must be skilfully carried out, so as to ensure the efficient use of the artillery, not only against the enemy's artillery, but against his infantry as well.

With the possible exception of some batteries, preferably batteries of pack artillery or field howitzers, which will generally be detailed as part of the general reserve to accompany and support the infantry in the counter-attack, no artillery should be kept in reserve by the defending force.

Positions must be chosen to command all the lines of approach and likely artillery positions of the enemy, but until the attack develops and the general situation becomes clearer, a portion only of the artillery should be brought into action, the remainder being kept in positions of readiness to come into action as occasion demands.

If the defending force has taken up a position for the purpose of delaying the enemy till some accession of strength renders the offensive possible, the commander will of necessity use his artillery as soon as he can do so with effect, to compel the enemy to deploy at long ranges and so gain time.

But if a defensive position has been occupied as offering the most advantageous opportunity for assuming the offensive by counter-attack, when the enemy has expended his energy in attack and losses have made numerical odds more favourable to the defending force, the artillery of the defence will usually seek to avoid an artillery duel, and withhold its fire until the attacking infantry reaches effective artillery ranges, unless some favourable opportunity previously offers of seizing the enemy at a disadvantage and inflicting severe loss upon him.

As the attack develops and it becomes possible to anticipate the enemy's intentions, the artillery of the defensive force will be distributed, so as to provide for the fullest development of fire against the artillery and infantry of the attacking force when the time comes to open fire. Some brigades or batteries should be told off to engage the hostile artillery, and others to direct their fire against the attacking infantry, a task requiring much decision and quickness, for the opportunities that occur at this stage will be fleeting only. These latter batteries will open fire as soon as the attacking infantry get within effective artillery ranges, and must use every effort to inflict loss upon them before they get to rifle range, for infantry officers tell us that, when on the defensive, the infantry are greatly encouraged by seeing the enemy's soldiers being killed and wounded when they themselves cannot touch them.

When these batteries open fire, the hostile artillery will almost certainly open fire in reply, and the batteries told off to engage the enemy's guns will then find their opportunity. Even though the batteries which are told off to fire upon the hostile infantry come under hostile artillery fire, they must continue to engage the enemy's infantry, trusting to the batteries detailed for the artillery duel to draw off the fire of the enemy's guns.

When the main attack of the enemy is disclosed, all the Q.-F. artillery, except such batteries as are required to co-operate with the heavy and howitzer field batteries in keeping down the fire of the enemy's guns, must be moved forward into masked positions to deal with the attacking infantry at decisive ranges: for the flat trajectory of Q.-F. guns at close ranges, and the necessity for a good field of fire to the immediate front, require the occupation of a position from which direct fire is possible at this later stage of the fight.

These positions must be prepared beforehand, and if they have been skilfully selected, cross and enfilade fire may be brought to bear on the attackers by means of the increased ranging powers of artillery, whereby the repulse of the attacking troops will be greatly aided.

To place guns in these positions at an early period of the fight and lose their service at a time when their effect might have an important influence on subsequent events cannot be sound, and difficult though it may be, and attended by some risk, to move these guns forward at the crisis when they are required, still no indication of their move will be given, as they will have been concealed till then, and so may easily escape notice in the turmoil of the fight, until ready to open fire from their forward position.

The fire of all these batteries must be concentrated upon the decisive fire position of the hostile infantry during the final fight for fire superiority, and upon the assaulting troops in the decisive attack, even though the hostile artillery seeks to overwhelm them by its fire.

To support the counter-attack these Q.-F. batteries will best co-operate with the general reserve from their forward position, for nothing would be gained by withdrawing some of them to accompany the general reserve in its offensive movement, and their fire action would be lost at a time when it is necessary to concentrate a heavy fire on the hostile infantry and guard against counter-measures from their side, for the enemy may seize the opportunity to press the decisive attack with renewed vigour.

By remaining in the positions which they occupy during the decisive stages of the attack, the full fire effect of these Q.-F. batteries can be brought to bear on the hostile troops against whom the counter-attack is directed, while the close support of the infantry of the general reserve will be provided for by the batteries of pack artillery or field howitzer batteries, which have been previously detailed for this purpose.

If the counter-attack succeeds, the Q.-F. artillery is used as circumstances require, so as to support the other troops to the utmost in pressing their advantage.

Having said so much about the action of artillery on the battlefield, a few remarks with regard to higher artillery commands will not be out of place, for the whole question of artillery tactics ultimately hinges on co-operation with the infantry, and the more

one considers the problem of co-operation between artillery and infantry whether in attack or defence, the more does it become evident how much depends on the tactical knowledge and skill of the higher commanders of artillery.

Provision has been made for these at Home by the appointment of Brigadier-Generals to command the artillery of divisions, but in India no such higher commands exist.

Upon whom then is the Divisional General to depend for the executive direction of the fire of the artillery, which requires the undivided attention of one officer? Who will carry out the preliminary artillery reconnaissance, upon the result of which must be drawn up a plan for the tactical employment of the artillery to accord with the general plan of action? Upon whom will devolve the difficult duty of deciding the various questions of disposal of the artillery, distribution of fire, communication, and ammunition supply? In short how is that effective combination of the fire of the various natures of artillery to be attained, upon which alone can the full power of that arm be developed?

These are the important and difficult duties which the higher artillery commanders are called upon to perform in other armies, and until the artillery of divisions in India is commanded by Brigadier-Generals, R.A., as at Home, the army may look in vain for the scientific combination of fire and skilful disposition of artillery upon the battlefield, so necessary to that effective co-operation with the other arms, upon which success must greatly depend.

SOME THOUGHTS ON TRAINING.

BY A REGIMENTAL OFFICER.

Our thoughts on training must, of necessity, be many and varied ; but, broadly speaking, they may be grouped under the following main headings, namely,—thoughts on practical work, and thoughts on numberless points of education, psychology, and racial development. All of these must demand our earnest attention, if our methods of training are to be kept up to date. Doubtless the thoughts of a regimental officer are chiefly engrossed with matters connected with the practical training of his men, and rightly so, since the ever-increasing demand for greater efficiency causes him to search continually for more facile methods, while every advance in practical training makes his task easier. In fact the more a regimental officer studies and thinks over the practical side of his profession, the easier will it be for him to give outward and visible sign of his interest and capability. Yet is it not possible to set too great a store by visible efficiency, so pleasing to the eye, so convincing in its proofs of all ordinary tests ? It must be clearly understood that this does not imply that true military efficiency can be overrated ; such efficiency must, and can be, the only aim and object of every effort made by regimental officers. But regimental efficiency, to have true military value, should be combined with many moral qualities which are perhaps even harder to come by. It is almost unnecessary, even hackneyed in a paper such as this, to write down one of Napoleon's best known maxims, namely, that " the moral is to the physical as three to one." Yet is it not possible that we, the regimental officers of to-day, sometimes confuse the moral with the physical. Are we not apt to consider, and to dismiss the matter from our minds without much further thought, that our battalions, in the pink of physical condition and trained to act at all times with the greatest *élan*, must of necessity possess that *moral*, which will carry them triumphant through the strain of modern war. Such physical fitness and training may set our footsteps on the high road to success, but they cannot of themselves drive us onward regardless of all obstacles. Of the many forces, which sway men's minds in war, patriotism, fanaticism, a righteous cause, and racial hatred are perhaps the strongest. Which of these may we count on to aid our Indian Army in the day of battle ? Of all, except the first, a fair measure, greater or less according to the circumstances under which war has become a necessity. But of the first, namely, of patriotism, it is harder to speak. We are apt to dismiss the idea of patriotism as something of an impossibility. In the past it may have been, but in the future we may have to reckon with it.

It would be presumption to attempt to define the numberless motives which cause a nation to have that collective thought, which we call patriotism. In the ordinary sense patriotism is understood to be love of one's own country, but surely patriotism has as its mainspring that instinct of racial preservation, which is common to all gregarious animals. This admitted, and the future is pregnant with possibilities. China has begun, slowly perhaps but none the less surely, to organize her army. If further she should begin to organize commercial and industrial enterprise on a national basis, then self-preservation may divide the world itself into two armed camps, the white men on the one side and the yellow men on the other, with the result that those who are neither white nor yellow will find themselves between the upper and the nether mill stones. In the interests of self-preservation they also will be compelled to take one side or the other.

It may seem that we have strayed far beyond the bounds within which a regimental officer could in reason allow his thoughts to wander, when thinking on the training of his battalion. Yet it seems certain that many officers now serving will see, whilst still serving, a North-East Frontier to our Indian Empire. And a frontier, it must be remembered, not marking the boundary of a country peopled by turbulent mountaineers, owning allegiance only where might enforces it, but a frontier marking the outposts of a great and civilised empire daily becoming more conscious of its strength. When such a frontier becomes a reality the moral effect which it must exercise on the minds of men of this country will be great indeed. "All things are in revolution; in change from moment to moment, which becomes sensible from epoch to epoch: in this Time-World of ours there is properly nothing else but revolution and mutation, and even nothing else conceivable" (Carlyle's French Revolution). Is it not the duty of every British officer, aided as far as possible by those, not only in authority but of higher intelligence and more mature experience, to follow and appreciate that "change from moment to moment" as far as in him lies? Is it not conceivable that the regimental officer of the Indian Army has a wider responsibility and a higher duty than those of the parade ground and manœuvre area? It is not implied that the latter can in any way be disregarded by the regimental officer. They form the sphere of his daily activity, and unless he devotes himself to them with unremitting zeal and self-denial, he can in no wise be fitted for any higher responsibility.

The British regimental officer lives in touch and daily intercourse with a fair sprinkling of the true manhood of this country, and through this sprinkling with a far wider circle, which he may never see or hear of. In some sense, therefore, he can be a leader of the people.

With politics the soldier can have no concern, but with the changes which time inevitably brings about it is another matter. It is our duty to treat all legitimate aspirations with sympathetic

consideration, and equally our duty to combat all foolish ideas and evil insinuations in a fearless spirit. But to do either, we must be on the closest terms of intimacy and good fellowship with our men, otherwise our best intentions may be misjudged and distrusted. Our interference, when justified, can only take the form of careful instruction, promoting broader minds and clearer vision on the part of our men. Unless it is given simply, and in a form that is easily understood, such interference may do more harm than good. Herein lies the difficulty. Do we stand in such relation to our men that we can, boldly and with confidence, undertake this difficult and delicate task ?

High military efficiency is the only possible standard for a good battalion, but is it inevitable that such efficiency must entail work at high pressure from year to year ? The conditions obtaining in a long-service army are vastly different from those obtaining in an army of short-service conscripts. The military lesson once learnt is not easily forgotten, and for the man in the ranks of a long-service army the work of each succeeding year must closely resemble that of previous years, must be in fact a series of repetitions varied only by a change of station or a new manœuvre area.

Work at high pressure means that our zeal, our energy, and our interest are all centred on the practical side of our profession, and there are few who have sufficient in reserve to cultivate those intimacies which are incompatible with the parade ground and manœuvre area.

Doubtless most regimental officers can tell to a nicety the professional capacity of the men under their command : but is there time now-a-days to know the man himself, to coax him from his reserve, or to gain his real confidence ? Yet may not such knowledge be of paramount importance.

Can British officers speak of the thoughts and ideas of their men with the same confidence as they can speak of the effect of any new scheme in training or discipline ? And yet perhaps the insight and sympathy required for the former are of as great a value in dealing with our Indian soldiers as the professional knowledge required for the latter. The desire that his battalion should be second to none in the service is at once the strength and weakness of the true regimental officer. His strength, because such desire is wholly of the right sort, his weakness, because it may cause his services to cease with the needs of his own battalion, may cause him even to seek the aggrandisement of his own battalion to the detriment of another. The British officer, or the Indian officer for that matter, is the servant of the State, not of the battalion.

Competition between battalions, while producing healthy emulation, may also tend to produce a ceaseless striving after small points which may help to show off one particular battalion as superior to another. How much time, thought, and care are often spent in the consideration of little points which officers hope will show their battalion to superior advantage, when all points of practical efficiency are equal.

It is not suggested that these small points are in any way intrinsically unsound: indeed, many of them tend to smartness and increased intelligence on the part of the men; but might not a great deal of this thought and time be more profitably expended in obtaining more useful, if less visible, results?

After all a regiment is really a co-operative society. True, the responsibilities, duties, and relative positions of the members are definitely apportioned by numberless regulations, while the penalties for misdoing and lack of zeal are clearly set forth. Yet co-operation is as much the basis of success in regimental life as in any other professional undertaking. True co-operation means something more than the well ordered conformity of a regulated system. It means the voluntary and unselfish effort of each individual in his own sphere for a common end, and this entails mutual sympathy, understanding, and regard in no small degree. Its attainment demands our earnest attention, but it is only by considerable personal effort that we can hope to attain it. One cannot but think that to obtain it we must meet our men more than half-way. The better our education and the broader our outlook, the more capable should we be of understanding the limitations which lack of education and the prejudice of ignorance place on theirs.

Surely this is no irksome duty requiring a passing effort, but an ideal which should be the aim and object of our lives, since for better or for worse we have been called upon to maintain, as a sacred trust, the empire which our fathers have handed down to us.

WIRELESS TELEGRAPHY AND ITS MILITARY USES.

A lecture delivered at Simla on 15th August 1910.

By CAPTAIN LL. EVANS, R.E.

H. E. THE COMMANDER-IN-CHIEF IN THE CHAIR.

Wireless telegraphy owes its origin to the genius of Hertz and Lodge, who while investigating problems connected with Clerk Maxwell's electro-magnetic theory of light, discovered experimentally facts, which Marconi brilliantly turned to practical account. Faraday, Maxwell, and their successors had amplified and confirmed a suggestion made by Sir Isaac Newton, that interstellar space is not an empty void but is filled with a medium to which he gave the name of æther. It is now very generally considered that this æther is of enormous elasticity and density, and that such bodies as the stars, our own earth, and incidentally ourselves, are wraiths of such tenuity that the loosely connected atoms which make them up pass easily from place to place in the æther. Theory goes further and suggests that all material bodies are only complex arrangements of electricity for the existence of which the æther is necessary, and, in fact, are merely particular conditions of the æther; but without labouring that point, it has been satisfactorily proved that for radiation whether of heat, light, or wireless waves, such a medium as æther is absolutely essential.

The method of propagation of these waves in the æther can be most easily understood by considering the analogy of a stone dropped into a pond. The point at which the stone is dropped is thrown into violent oscillation and a series of waves is formed which expands outwards concentrically from the point where the stone was dropped. They continue in widening circles until, at a distance which depends on the amount of the original disturbance, they disappear, while after the formation of a certain number of waves the water at the original point of disturbance comes to rest. Similar waves are produced in air by a suitable disturbing cause, but the waves on which wireless telegraphy is dependent are not vibration of water or air but are formed in the æther alone. If we can manage to make a sufficiently sudden disturbance in the æther we shall produce waves the presence of which, given proper apparatus, we can appreciate at a distance. The sun, of course, is the best known producer of æther waves, and the waves which it produces, and which we call heat and light waves, roughly speaking differ in only one essential particular from the waves used for wireless telegraphy. This particular is their length. In the case of a light wave, the

length is a very small portion of an inch (about $\frac{1}{1000000}$) while the smallest observed length of a wireless telegraph wave is two or three inches and for practical work some hundreds or even thousands of feet. Another important point is the speed at which light and wireless telegraph waves travel. This is the same for both and is approximately 186,000 miles per second, the practical interest of this being that for terrestrial wireless telegraphy a signal will be received at its destination simultaneously with its generation at the transmitter.

The next point to consider is the method of making the splash in the æther and the way in which this produces æther waves.

Hertz employed an apparatus (Fig. 1), consisting of two metal plates to which were attached stout metal rods, the free ends of these rods terminating in two knobs which were separated from each other by a small air gap. To these knobs he connected an induction coil, so that on exciting the coil by a battery the rods and plates were charged with opposite kinds of electricity. Let us suppose one plate charged with positive electricity and consequently the other with negative. Then, stretching from any positive unit on one plate to a corresponding negative unit on the other a line of electric strain will be formed in the æther. When the pressure of electricity on the gap becomes too great for the resistance of the air, the positive and negative charges will attempt to unite and neutralise each other, and a spark will be formed between the knobs. The positive unit of electricity will rush towards the negative, the successive positions of the line of strain connecting these units being shown in the diagrams (Fig. 2).

Now these units of electricity have inertia, and consequently they will not come to rest in the central position at once, but, like a pendulum, will only gradually do so after successive excursions to and fro, the number of which will depend on certain electrical qualities of the apparatus. The æther also has inertia, and consequently the line of strain attached to the units of electricity will not disappear, but will form closed loops in the æther, each of which will be pushed outwards through space as the next loop is formed. I have only shown two lines of strain in the diagrams to avoid confusion, but it is obvious that these loops will proceed in all directions from the apparatus with their centres on the horizontal plane passing through the spark gap. The movement of these loops in the æther forms rings of magnetic flux (two of which are shown in one of the diagrams) in a plane at right angles to them, this combination forming an electro-magnetic vibration or wave motion, the energy of the wave being equally divided between the electric strain and the magnetic flux. The number of the loops formed, that is, the length of the train of waves, obviously depends on the number of swings or oscillation of the charges of electricity, but as long as the induction coil is kept in action the plates will be charged, sparks will be formed, the plates will be discharged with oscillations, and train after train of electro-magnetic waves will be generated.

If now a wire is placed in the way of the advancing wave, as the first wave front meets it the top of the wire will become, say, positive and the bottom negative, and hence a small current will flow down the wire; when the next wave front arrives these effects will be reversed so that a small current will flow in the opposite direction. In short a current oscillating the same number of times per second as the current in the transmitter will be set up in this wire. Marconi seeing the practical significance of these facts proceeded to erect a vertical wire with a knob at its lower end (representing one half of the Hertz apparatus) separated by an air gap from a knob which he connected to earth, which in this case played the part of the other plate of the Hertz apparatus. On exciting this aerial with an induction coil the same action takes place, though much intensified, as described for the Hertz apparatus, and waves proceed out along the surface of the earth in all directions from the aerial (Fig. 3).

For various technical reasons the spark gap is no longer placed in the aerial but in a separate circuit which excites the aerial inductively, the result—propagation of electric waves—being the same as in the earlier method. Assisted by many important improvements in the apparatus, Marconi proceeded to increase the range of his stations by increase first in the height of his masts from which his aerials were slung, and secondly in the amount of electrical energy employed, using powerful dynamos in place of the original small batteries, these two—height of aerial and amount of electrical energy—being the chief factors on which the range of communication depends, apart from considerations of the nature of the intervening country, which will be mentioned later.

There are one or two other methods of making a splash in the æther produced by Poulsen, Arco, and von Lepel, but, as they have not obtained any great practical success at present and are in fact still in a more or less experimental state, it is only necessary to say that, although the methods differ from that I have described, they yet produce the same type of wave, the only difference being that each train of waves is longer but of smaller amplitude.

Now to turn for a moment to the very important point that has made wireless telegraphy a practical means of communication. I mean tuning. To explain this, another analogy may be useful. If one takes a tuning fork of some particular musical note, strikes it, and places it on a piano, the wire in the piano which has the same note will be set vibrating, but no other wire in the piano will, to any appreciable extent. The reason is this. The tuning fork vibrates a certain number of times per second, the number depending on the weight of the fork and its length: the piano wire also naturally vibrates at a certain rate due to its weight, length, and tension. If they both naturally vibrate at the same rate, the tuning fork, by making the surrounding air vibrate, that is, by producing air waves the length of which depends on the number of vibrations per second, communicates its vibrations to the wire, which picks up the vibrations

and responds. In this way very considerable results are produced by very slight impulses: but it must be emphasised that this ready response depends entirely on the tuning fork and the piano wire having the same natural rate of vibration, and hence other wires which do not comply with this condition remain unaffected by the disturbance.

This principle of tuning or resonance can be observed under all sorts of conditions, the order for troops to break step when crossing military bridges being a consequence of the great danger that, if the marching pace and the natural period of vibration of the bridge are the same, sufficient oscillation may be produced to break the bridge.

There are two electrical qualities in the Station which I shall describe which correspond roughly to the length and weight of the piano wire, so that by altering the aerial in such a way as to vary the dimensions of these two qualities, it is possible to vary the number of times the aerial will vibrate electrically per second, and consequently in the same way as for air waves, to vary the length of wave or tune of the aerial. These two electrical qualities, called inductance and capacity, are dependent on the length, number, and disposition of the wires composing the aerial, and one may say roughly that the longer the aerial is made and the greater the number of wires included in it, the longer will be the wave.

The operation of altering the aerial has been made a very simple one, with the consequence that one is enabled to alter the tune easily and rapidly. The practical results are, therefore, that, by tuning the transmitter, one can send out waves of any length one likes, and, by tuning the receiver, interferences—that is, waves other than the one it is desired to receive—are prevented from affecting the receiver, while waves which, without taking advantage of the principle of tuning, would be inappreciable, can be easily detected. Hertz early discovered that his receiver when properly tuned responded to waves from the transmitter which it entirely failed to detect when of incorrect length or shape. In well designed systems, such as that of the Navy, tuning has been so perfected that it has been possible to receive a message without any interference on an aerial rigged on one mast of a ship, while a message was being sent on a different tune from an aerial rigged on the other mast of the same ship.

In practically all systems of wireless telegraphy waves are sent out horizontally in all directions along the surface of the ground, but while, at the transmitter, their height is roughly comparable to the height of the aerial, as they spread horizontally they very rapidly increase vertically till a few miles from the transmitter they are probably some thousands of feet high. The obvious consequence is that the proportion of the transmitted energy, which arrives at any aerial situated at some distant point, is minute, and the current produced in the aerial very weak. Hence for its detection some very sensitive device, much more delicate than any ordinary galvanometer is

required. Such a device was the filings tube coherer invented by Branly and subsequently improved and adopted by Marconi. This instrument is now, however, of purely academic interest, and I propose to describe a more modern wave detector, which is sufficiently typical of the methods involved in the reception of signals.

This is the electrolytic detector (Fig. 6) and consists of a small glass jar containing dilute acid. Into this jar dip a stout platinum wire and a second very fine platinum wire fused into a glass tube so that only the tip is exposed. In the simplest method of using this detector, the fine platinum wire is connected to the aerial wire and also to one pole of a battery, the other pole being connected to a telephone receiver. The stout platinum wire is connected to earth and to the telephone receiver. As soon as these connections are made, a current from the battery flows through the telephone and detector, and starts decomposition of the acid, causing a minute bubble of gas to form on the end of the fine wire. This bubble is an insulator and consequently the current stops flowing. But as soon as an oscillating current is set up in the aerial by waves from a distant transmitter, it dissipates this gas bubble, and a current from the battery again flows through the detector and telephone, causing a click in the telephone, but also causing another insulating bubble to form on the fine wire. As long as the aerial continues to oscillate, this action and reaction will take place, the successive clicks in the telephone succeeding each other so rapidly as in the aggregate to form a continuous buzz.

If the transmitter is so operated as to send out different numbers of trains of waves corresponding to dots and dashes of the Morse alphabet, long and short buzzes will be heard in the telephone receiver, since directly the oscillations in the receiving aerial cease, a bubble of gas puts a stop to the battery current, until operations are started again by the distant transmitter.

The pitch of the sound heard in the telephone receiver depends on the number of times the diaphragm of the telephone vibrates per second. This number depends on the number of trains of waves received per second, and this again on the number of sparks made in the transmitter per second. As a consequence, by making a definite number of sparks per second, a definite musical note can be produced in the receiver, and so the actual station transmitting can often be recognised merely by the pitch of its signals. This definite musical note is obtained by substituting for one of the fixed spark knobs a rotating disc, on the circumference of which are a number of equidistant projections or studs. Every time a stud comes close to the fixed spark knob a spark passes, so that by revolving a properly designed disc at the right speed the number of sparks per second necessary for almost any note on the piano can be produced.

Marconi invented a most excellent detector, which is in general use in the Navy, but it is open to the objection that it is not nearly so sensitive as some other forms, although extremely reliable and practically fool-proof. Even simpler forms of detector more suited

to field service are now available, but, as their action is rather obscure it is not proposed to describe them.

Mention has been made of the fact that nearly all systems radiate out waves in all directions, but there are two methods which have distinctly directive effects.

One, due to Marconi (Fig. 8), consists in marking the aerial of L shape, the shorter arm being placed vertically and connected through the apparatus to the earth, the longer arm being stretched out horizontally on masts above the surface of the earth. The result, stated very roughly, is that the lines of strain are distorted into an unsymmetrical shape, and the greater part of the radiation, accompanied by some increase of range, takes place in the direction opposite to that in which the free end of the wire points.

The other system, though a better directive arrangement, is rather complicated and does not appear suited for military purposes.

By reference to Fig. 3 it will be seen that the waves travel along the surface of the ground with their feet fixed to it, and it is owing to this fact that the nature of the surface is of importance and has a very considerable influence on the range over which wireless telegraphy can work.

The sea, as a very good conductor of electricity and a flat surface, is the best over which to work wireless: in fact as a general rule the range of a station over sea may be taken to be as much as twice that of the same station over ordinary country. A wet country comes next in order of suitability, and really dry land is the worst. Other things, however, can neutralise much of the advantage that wet country has over dry. For instance, every tree and, to a less extent, every building—in fact all upstanding obstacles—are receiving aërials, and consequently absorb their proportion of the radiated energy, so that when interposed between the transmitter and receiver, much of the energy, which in an open country would arrive at the receiver, is lost in the intervening obstacles.

From what has been said it must be obvious that mountains or high hills are serious obstacles to wireless waves. In passing over them, the waves are distorted and generally knocked about, with the result that the range is seriously diminished, possibly to less than half of that obtainable in flat country. The obvious criticism to make is that the mountainous parts of this country are most unsuited for wireless, but its great usefulness to an army in the field and more especially to an army in such a country as this is obvious, and there are strong hopes that the difficulties as to hill country and dry soil may be partially counterbalanced by the absence of much wooded country, and overcome by the provision of proportionately more powerful stations.

Extraordinary results are often obtained in practice as regards the range of stations which could not have been anticipated from theory. For instance, the Government Telegraph Department wireless stations at Calcutta, Bombay, and Jashk have exchanged messages by night with ships at a range three or four times as great as their

range by day would allow. Such instances might be multiplied, and are well known to wireless telegraph engineers, but, although such possibilities may often be of enormous value, it is unwise to count on their occurrence at any given time.

Any allusion to wireless telephony has been purposely omitted, as, with a single exception, which I shall describe later and which is now under trial and is likely to have only a limited use, it cannot be regarded at present as a practical method of communication in the field.

It may be as well to mention here, in case any disappointment is felt at the small probability of wireless telephones being available for some little time to come, that under equal conditions telephony is not nearly so rapid nor so accurate as telegraphy, and were it possible to obtain enough telegraph operators for the service, I fancy telephones would be very sparingly used.

Even ordinary telephones require carefully trained operators to ensure good results, while wireless telephony, involving as it does practically the same apparatus as wireless telegraphy, with various additional delicate instruments, would necessitate not only these trained operators but the wireless technical staff as well.

The one system to which reference has been made as being likely to be useful, is that of the Helsby Wireless Telegraph Company, and is quite simple. It is intended for communication over ranges of three or four miles and consists of a special type of induction coil, telephone transmitter, and receiver, from which wires are laid along the ground, while the outer ends of the wires are connected to earth, no masts being necessary. The length of these wires must be not less than about one-twentieth of the distance over which communication is required, and similar wires at the distant station must be laid out roughly parallel to them. The whole apparatus can be carried by one man. One objection to this system is that, if one station lays out its wires at right angles to those of the other station, no signals can be exchanged and some practical difficulties may be experienced from this fact. The other main objection is that it cannot be tuned, and consequently very few stations can be operated simultaneously in one area. It is, however, so portable and so devoid of complications that for some purposes it might be invaluable.

So far I have been concerned with the principles of wireless telegraphy: I now propose to explain shortly the lines along which this method of communication is being developed in the Home Army.

After considerable experience of wireless, it was decided to employ it for the internal and external communications of the Cavalry Division, and, with this in view, two types of wireless telegraph stations were decided on:—one a fairly large station carried in a limber wagon, where the apparatus was fixed ready for work and permanently connected up, and the other a smaller station capable of transport either in limbered G. S. wagons or on pack animals.

The larger station was designed to have a range of about 80 miles, and I have heard lately that it has fulfilled anticipations in this respect. It is capable of erection in something slightly under half an hour by a well drilled squad. The mast is telescopic, about 12 feet long when closed, extending for use to 80 feet, and is carried fixed permanently in trunnions on the rear half of the limber wagon. The aerial, consisting of 12 wires, is guyed out from the top of the mast like the ribs of an umbrella, a single feeder wire going from the apparatus in the limber to the top of the mast.

The smaller station had a maximum range of 15 miles, and could be erected in 15 minutes. It was, however, considered that these stations had not sufficient range—30 miles being required—and 15 minutes was considered too long for erection. This station was originally designed for pack transport, but the design is, I believe, being now reconsidered with a view to an increase of range. It should be possible to obtain this increase, but it is doubtful if any material reduction in the time of erection can be made, as long as the apparatus has to be designed for pack transport.

I have however just received details from home of a pack transport W/T station which at any rate fulfils the condition as to range. This station has been designed by the Marconi Company in accordance with the requirements of the service, and has a range in ordinary country of about 30 miles, while it can be erected in about quarter of an hour. It has two masts, each 30 feet high, and a directional aerial similar to that shown in Diagram 8, the length of which is about 120 yards; a small dynamo driven by a 240 petrol motor supplies the energy for transmission. The whole design appears to have been thought out very carefully and to indicate that pack transport W/T stations are now thoroughly practical while the increase of range obtained over that of previous pack stations would be invaluable.

As regards *personnel* and transport at home. The large station requires a detachment of one N.-C. O. and eight men for erection, all of whom are either mounted or carried on the wagon. The load behind the team of six horses is about 35 cwt. To accompany each station a light wagon for spare stores, rations, etc., is provided, so as to make each station an entirely independent unit.

The small station required a detachment of one N.-C. O. and six men all of whom were mounted, and, when carried on pack animals, it required three for the actual station. No allowance was made for the pack transport of rations, etc., as it was considered that normally the station would be carried in the limbered G. S. wagon, in which rations and spare stores could also be carried. In this case two of the pack horses would be put in draught so as to form a four horse team for the wagon.

Five of the large stations and three of the small form the equipment of a wireless telegraph company. These numbers were based on the idea that two large stations should accompany each army headquarters, three large stations the cavalry division headquarters,

which would presumably be with one of the brigades, and that the three small stations should be distributed for the internal communication of the division in accordance with the wishes of the General Officer Commanding. The object of allotting two large stations to army headquarters is to allow of more or less continuous communication with the cavalry division, as while one station is actually working messages with one of the large stations of the cavalry division the other large station with army headquarters and its opposite number in the cavalry division can be moving on to the next suitable place for establishing communication.

The third large station with the cavalry division is to be used to communicate with the smaller stations, that is, for the internal communications of the division.

There was a desire at home to use wireless telegraphy with contact squadrons, but I do not think that, at any rate at the present time, it can be suitably employed in this way. There would always be a danger of the position and movements of the squadron being given away by the wireless mast, as they would not in many cases be in a position to choose a well concealed site for the station, while a more serious danger seems to be that, however rapidly and well the station may be handled, it would always tend to hamper the squadron leader, and in attempting to ensure its safety his attention might be distracted from his real objective.

A further use for wireless is contemplated in the future. The idea is to raise another company, and to give this company the smaller type of station. The rôle of the company would be to assist the cable telegraph companies in establishing lateral communication between infantry divisions. This duty of the cable companies is one of the most irksome and arduous that fall to their lot, as it entails laying cable laterally between divisions, when those divisions halt for the night, and, of course, picking it up again as soon as the next day's march begins, in addition to their ordinary work of keeping the divisions in communication on the march. It is now thought that small wireless telegraph stations could provide this lateral communication successfully and with a far smaller expenditure of man power than that involved in cable laying.

As regards a possible organization for wireless in the Indian Army, a wireless company would presumably be required for the cavalry on each line of advance.

It is unlikely that any greater range than 30 miles in ordinary country will be obtained with pack transport wireless stations, at any rate for some time to come, without an excessive number of mule loads; and, as a consequence, if independent cavalry working at greater distances from the main army is to communicate with headquarters by wireless, an intermediate transmitting station will be necessary. It would also probably be desirable to allow for communication by wireless between the independent cavalry and a detached cavalry force. These considerations would necessitate the provision of eight stations in each wireless company, if the principle

adopted at home of duplicating stations were followed. I should like to point out that if in addition to pack transport, light wagons were provided—such wagons as could move wherever horse artillery guns can go—and in these wagons a more powerful motor and dynamo and a taller mast than is possible with pack transport were carried, by using these in conjunction with the pack transport equipment, an increase of 15 or 20 miles in the range of the stations in ordinary country should be obtained, while at the same time the rapidity of erection would probably be increased.

The size of detachments would require to be the same as at home. A pack station could be carried on four mules with a fifth for the necessary office tent and various spare stores, while it would be a question for serious consideration whether the detachment should not be mounted, so as to give them the ability to cover rapidly the distance between one position and the next.

A further possible use for wireless telegraphy in this country would be on the lines of communication in the case of operations beyond the frontier, whenever ordinary telegraph lines were in danger of being cut. Here semi-permanent stations might be constructed and, although the rate of sending could not of course compare with what the Telegraph Department are capable of by the use of their high speed transmitters, still, allowing for the periods during which such communication could be interrupted by hostile raiding parties, wireless would probably be nearly able to deal with the same volume of work as the alternative land line.

As regards the reliability of wireless, taking into consideration the probability of cable and airline being cut by the enemy, it is not unduly optimistic to say that wireless telegraphy is now as reliable as ordinary field telegraphs, always provided that there is no attempt made to use it beyond its certain range; and, of course, it is considerably more reliable than helio, lamp, or flag.

Very severe thunderstorms may put a stop temporarily to wireless telegraph communication, but provided there is a reasonable margin of power available, ordinary atmospheric disturbances can be disregarded. The reason is that the sound made in a wireless receiver by lightning has quite a different musical note from that of the Morse signals, and consequently if the signals are moderately strong the noise of the lightning does not interfere with the reception, while even if work is impossible a wireless station is a useful thing to have, as it acts as a very fairly efficient lightning conductor.

Wireless telegraphy, in competent hands, was often worked in England at 25 words a minute and at times even as rapidly as 30. In fact the only limit is that imposed by the skill of the operators. Its rate of dealing with messages was found to be rather slower than ordinary field telegraphs, as, although the actual speed of transmission of words is the same, various technical details render the transmission of a complete message a slightly longer business. The rate is, however, generally considerably faster

than that of visual signalling, whose chief advantages appear to be portability and rapidity of installation.

A point of considerable importance is the question of secrecy. When speaking of tuning, I tried to explain how it was possible to prevent an enemy's station interfering with one's message. Unfortunately, the very perfection to which tuning has been brought, while tending to ensure immunity from hostile interference, also involves great facility for picking up other people's messages, and it would therefore be essential in any war with a civilised enemy to encipher all messages transmitted by wireless telegraphy.

A manual of procedure for wireless telegraph communication has been prepared at Aldershot with two main objects in view. The first is to avoid interference from an enemy who, having no messages to send himself, wishes to fill in time by preventing one's own messages being received correctly. A method has been arranged, by which, at a preconcerted signal, the tune in use is changed, and this can be done often enough to prevent an enemy effectually stopping one's work, although of course he may delay it. The other object is to enable several wireless telegraph stations to be simultaneously employed in the same area. By following the procedure laid down and making suitable use of different tunes, it is possible to send several messages under these conditions without interference. The extent to which this can be done, however, is limited, since the number of tunes which can be used in practice is limited, and its success largely depends on the amount of information which the communication officer has as to the situation and probable movements of the army. In this connection an extract from a lecture delivered last year by Colonel Davies of the General Staff 1st Division at Aldershot on the subject of the communications of a division in the field may be quoted. Although no reference to wireless was intended, he deals so thoroughly with the relations between the Staff and the communication officers, and his remarks are so peculiarly applicable to wireless telegraph communications, that I feel no apology is required for the quotation, especially as his observations are made with an authority to which I cannot pretend. Speaking of the tactical handling of communications, he says:—

"It is absolutely essential that the relations between the staff officer and the communication officer should be of the most intimate kind. * * * * The staff officer must take the communication officer completely into his confidence and give him the earliest possible information of all intended movements and of the probable course of events so far as they can be foreseen. * * * *

And again—

"If neither the General nor his staff take the communication officer into their confidence; if without informing him of the probable course of events they ask him to perform impossibilities; if they think it sufficient to say vaguely in orders: 'The communication officer will maintain communication with all the units of the

division; then his path will be thorny, his difficulties will be many, and the communications will most certainly be bad."

It is one of the obvious difficulties in the organization of communication by wireless telegraphy in the field that communication can only be established between two moving forces by a prearranged time-table. This has generally been done with complete success, but last year during manœuvres at home a failure had to be recorded. During one day's operations three stations were erected with three different columns, but unfortunately all at different times, with the consequence that though communication, which was urgently required, might easily have been established, not a single message was transmitted. This occurred in the north of Wiltshire, and it was peculiarly annoying to be vainly calling up a station only four or five miles away, and to get messages from a ship in the Channel instead.

Speaking as a communication officer—and therefore as a servant of the staff—I may perhaps be permitted to call attention to one or two difficulties with which the communication officer has to cope and which are referred to in Field Service Regulations. One of these is the habit which grew to such alarming proportions in South Africa of wiring about subjects of the most trivial importance; and even when this habit is successfully checked, many officers appear to indulge a literary bent by an extraordinary and untimely verbosity. This is sufficiently serious for ordinary telegraphs, but, when several wireless stations are working in one area, unnecessary or unduly long messages are very liable to cause delay to important orders, as it is generally impossible to stop another station in the middle of a message, which it must be allowed to finish before the important despatch can be sent.

This difficulty has been appreciated in the German Army and in their Field Service Regulations definite powers are given to certain communication officers not only to decide the order in which messages are to be despatched but also in extreme cases to delete from messages any words they consider unnecessary.

Again, although it is laid down in Field Service Regulations that important communications should be sent by more than one means, a period of incredulity, when officers frankly disbelieved that any message ever reached its destination, was succeeded by a period when everything was expected of Wireless, and the order quoted above neglected, with results fraught at times with embarrassment not only for the wireless telegraph officer but also for the staff.

Finally, as to the future of wireless—the majority of recent inventions seem perhaps more suited to permanent stations than for military purposes, at any rate in this country, where weights are rigorously limited by considerations of transport; and while minor improvements will no doubt take place continuously, wireless telegraphy has now reached a thoroughly practical position, from which the next really important advance may not take place until some method for the production of wireless waves is invented, as economical and efficient as the glow-worm's method of producing light.

THE PSYCHOLOGY OF CROWDS AND ITS RELATION TO THE ARMY.

BY CAPTAIN G. M. ORR, 11TH (K. E. O.) LANCERS.

In a recent article,* on the spirit of the offensive, I had occasion to quote from a lecture on "Some Moral Aspects of War." The quotation was to the effect that a study of the psychology of crowds would show that since an army was a "crowd" with a common training it would be easier to move than any other crowd to unanimous action. Hence it was deduced that the spirit which compelled an advance, or a passive defence, or a retirement, may well have been transmitted by the leaders.

Leadership, to be efficient, must take account of all moral factors. Every leader of men, from a troop to an army, is necessarily a student of psychology, bound up as it is with the study of all the moral forces which play so great a part in war. Not the least important is a knowledge of the manner in which the opinions and beliefs of the men we are to lead in war may be affected by the ideas engendered during peace. The tendency in peace is to forget the importance of these forces. This is partly due to the fact that it is only under the stress of war that the more important moral factors betray themselves.

It is proposed in this article to show very briefly what are the different characteristics and the factors which influence the opinion of crowds, and to try and see in what way they particularly affect the leadership of an armed and organized crowd, such as an army.

I am indebted for all that I am going to say concerning the characteristics of crowds to the writings of Dr. Gustave Le Bon, from which I take the liberty of quoting.

The chief point to remember is that a crowd's mind is not the average of the sum of the minds of its individuals, but a combination followed by the creation of new characteristics.

For purposes of classification crowds may be divided into two kinds, heterogeneous and homogeneous. The heterogeneous class may be subdivided into crowds of an anonymous kind, such as street crowds, and crowds not anonymous, such as juries or parliamentary assemblies. The homogeneous class may be subdivided into sects, political or religious; classes, such as the upper or middle classes or the peasantry; and castes, such as a priestly or military caste. From the above it will be noticed that the masses from whom the ranks of an army are formed are heterogeneous. It is not till they are trained that they become a homogeneous crowd, or military caste. "A caste represents the highest degree of crowd organization, composed as it is of individuals similarly educated, and of much the same social status."

* "Some Moral Factors in War," July 1910.

The first peculiarity that Dr. Le Bon draws attention to is that the individuality of each person becomes weakened, and practically disappears as soon as he becomes a member of a crowd. Once in a crowd the characteristics of the individuals composing it become absorbed in the new characteristics peculiar to the crowd unit, and a collective mind is formed. "Individuals feel, think, and act in a manner quite different from that in which each individual would feel, think, and act were he in a state of isolation."

In short, the individuals composing a crowd become irresponsible. Men are less conscientious when they think they are not personally responsible for the result of their actions, and they readily follow a lead.

We all realise that, over and over again, it is the motives which we are not conscious of, which drive us to do things, rather than any reasoned sequence of events. When, added to this, there is no responsibility, then there is still less inducement for reason, so that the motives under the surface have full play. Men in a crowd are no longer concerned with the why and the wherefore. Their minds being little adapted to reason, they are quick to act on a suggestion, which by a process of contagion spreads from one to another. "A crowd, readily yielding to all suggestions, having all the violence of feeling peculiar to beings who cannot appeal to the influence of reason, deprived of all critical faculty, cannot be otherwise than excessively credulous." Being thus at the mercy of all external exciting causes a crowd is impulsive. Again, because the causes which act on crowds are so varied, the crowds themselves are variable, mobile as Dr. Le Bon calls them. Owing to its collective irresponsibility "the notion of impossibility disappears in a crowd, and it is not prepared to admit that anything can come between its desire and the realisation of its desire." It is easy to understand how this feeling of power when successful might carry in its train conservatism and tyranny, or when thwarted induce irritability and intolerance. From this very fact, that crowds have an irresponsible feeling of power, it follows that they have a great respect for force, and are but slightly impressed by kindness, which to them is a sign of weakness. While they bow down servilely before a strong authority, they are ready to revolt against a feeble one.

Dr. Le Bon remarks that it cannot be said absolutely that crowds are not influenced by reasoning or do not reason, but that their reasoning power is of a very inferior order. He says "the characteristics of the reasoning of crowds are the association of dissimilar things possessing a merely apparent connection between each other, and the immediate generalisation of particular cases. A chain of logical argumentation is totally incomprehensible to crowds. Judgments accepted by crowds are merely judgments forced on them, and never judgments adopted after discussion."

Since reasoning plays so small a part in influencing a crowd, he who wishes to rule one must understand the art of appealing to it. Those who may have read the so-called "fighting speeches" of certain

politicians before the elections of 1909 cannot but have felt that the crowd listening must have been impressed and influenced; yet reading those same speeches as an arm-chair critic one was equally struck by the weakness of their arguments. To appeal to a crowd one must impress its imagination. Dr. Le Bon aptly points out that it was not by means of cunning rhetoric that Antony succeeded in raising the populace against the murderers of Caesar, but by reading his will and pointing to the corpse. The basis of power of every leader of men in the world's history has been the popular imagination. Dr. Le Bon quotes the great Napoleon, who said, "It was by becoming a Catholic that I terminated the Vendéen war, by becoming a Mussalman that I obtained a footing in Egypt, by becoming an Ultramontane that I won over the Italian priests; and had I to govern a nation of Jews I would rebuild Solomon's temple." It is not the facts themselves that strike the popular imagination, but the way in which they are brought to notice.

Dr. Le Bon has much to say on the subject of the power of religious sentiment. Religion is an essential factor in the making of a nation. A strong religious spirit in the ranks of an army is an undoubted asset in war. In our own history Cromwell's Model Army is a pertinent example.

Having so far become acquainted with certain general characteristics of crowds, such as concern their modes of feeling, thinking, and reasoning, we can now consider the factors which determine their opinions and beliefs. Dr. Le Bon classifies them as of two kinds—those which are remote and which prepare the ground, so to speak; and those which are immediate and are the source of active persuasion.

Remote factors are time, race, tradition, education.

Without time we cannot prepare the soil in which we wish to sow those ideas which will grow up into the opinions and beliefs we desire.

Race is the most important of all, and men of different countries vary considerably in their characteristics. This is important to remember when dealing with an army whose component parts vary in racial characteristics so much as our Imperial Army. All of us know the power of tradition. It must be a poor people indeed that has not some noble tradition of the past to inspire it for the future.

The importance of national education cannot be over estimated. By it the mind of a nation is influenced for good or evil. It must aim at the development of character and not at mere book learning. Above all it must not leave the people discontented with their lot. It is worth thinking over, whether the people of Great Britain or of India are being nationally educated to become worthy members of the Empire. Does the Britisher's national education teach him what real patriotism is? No school that I know of teaches it. How many Britishers of all our millions put themselves to any serious inconvenience for the good of the State? Patriotism, love of country,

to die for one's country, is an incalculable asset in an army. While at home and in our colonies we may rightly expect it, it must be otherwise with our coloured forces. Nevertheless we know that even the men joining our British Army know nothing about patriotism. It therefore behoves us officers to do everything in our power to inculcate it.

As immediate factors there are speech, illusion, and experience. The power of words is great. Through them images are invoked in men's minds. "Crowds have always been susceptible to illusions. Whoever can supply them with illusions is easily their master; whoever attempts to destroy their illusions is always their victim." Experience is the process by which theory becomes fact and a truth is solidly established.

One of the characteristics of a crowd is to place itself under a leader. "A crowd is a servile flock incapable of doing without a master." Let us then see by what means the leaders of crowds may control the actions of crowds. Probably strength of will is the greatest asset; the exercise of strength of will, even temporarily, is sufficient to direct a violent enterprise suddenly decided on, to transform a crowd of mere recruits into heroes. In time of war opportunities of such a power must often occur. Le Bon says that, men of enduring strength of will provide the founders of great undertakings. I have said that one of the predominant features of a crowd is its desire to submit to a master. If that master has inspired the crowd with confidence in himself, then his leadership is destined to last long, and much is within his power.

It is given to us all to try and gain the confidence of our men, by our actions to set an example, by our solicitude for their health and welfare to gain their affections. Perhaps it is given to the officers of no nation more than ours to inspire that confidence which is largely obtained by being in touch with our men. I think we are justified from past history in believing that we are more readily followed as officers, by men of any colour, than are the officers of any other nation. At the same time the value of being in real touch must not be lost sight of, and this is more especially the case when dealing with our coloured force. A great Indian soldier, Sir Charles Brownlow, said "with an Asiatic soldier personal influence is the beginning and end of all powers." Remember, we can hardly look to patriotism in our Indian ranks, but we can by our personal influence make them confident of the justness of the cause for which we ask them to fight. Let those who wish to know the lines on which touch with Indian ranks may be obtained and kept, read the confidential circular sent to the Indian army in August 1907, a copy of which is given to every officer in the Indian army when he joins.

Mutual confidence between officers and men as the result of intimacy, and knowledge of the ability of their superiors on the part of the men, will go far towards imbuing the ranks themselves with that feeling of comradeship, which is so essential under modern conditions of war. Nowadays war more than ever

means great privations, much marching, little of that good old clash of battle that stirred men's blood. On the battlefield the soldier will find that he is all day under fire, all night expecting a night attack, unable to sleep, or smoke, probably with dead or dying comrades round him. Moral courage can no longer be obtained by the old shoulder to shoulder advance. Martial music can no longer inspire regiments in the long drawn out advances of the present day. There are no colours for the men to rally to, "to act as the emblem of that spirit of loyalty which binds a regiment together as a unit, and symbolises its allegiance to the Sovereign." Even the colour of our uniform is a disadvantage compared with the old red or blue. All this means that the moral strength of the ranks must be more highly developed, and in such a way that cohesion is maintained. The tendency is for control to pass out of the hands of those who should exercise it, and hence the necessity of some means of checking the power thus put in the hands of the lower ranks. This is where discipline comes in and puts the final clasp on the mass of men which by its military training has gradually developed from a heterogeneous crowd to a homogeneous body of armed men, ready to obey the will of its leaders in whom it has learnt to have confidence.

The question as to what discipline is, is a difficult one. Its aim is undoubtedly to make men obedient on the battlefield, to make them fight in spite of themselves. It is thus an important factor in the psychological process of transmitting the mind of the leader to the ranks. From the very fact that one of the chief characteristics of individuals forming a crowd is that they lose their individuality, I argue that to try and produce individuality in the ranks is a mistake. Rather influence the minds, which are organized by discipline, and work on the characteristics, which are part of the crowd mind, in order to get the concerted action which is wanted on the battlefield. Close proximity is not necessary for the individuals forming an organized crowd to receive the suggestion that is to be put into action. Discipline, too, is the only sure means of developing a characteristic such as our British coolness in the face of danger. In a recent article in the *National Review* Sir Edmund Barrow said, "Our people may not have the *élan* of the French, the stubborn stolidity of the Russian, or the scientific learning of the German, but they possess a species of dogged sangfroid and a coolness at critical moments. Coolness in danger or emergency is a hereditary racial trait, but even an inherited instinct has to be cultivated in order to make it so instinctive that it becomes a habit."

There are two things to be overcome in war, which are not appreciated in peace, one is fatigue and the other fear. Fatigue may possibly be overcome by a careful physical training in peace. Fear can probably only be combated by a higher education based on a strong feeling of duty, and of confidence in leadership. But when the crisis comes it is discipline that will play the most important part. Nowadays the great object is to develop the individual intelligence of the ranks. In striving after this object the tendency is to exaggerate

the importance of individualism at the expense of discipline; to forget that, however valuable it may be to carry out orders intelligently, it is an order which is to be carried out and not a subject to be debated over. If an order is obeyed because it agrees with what the recipient thinks should be done, it is not discipline. He should obey because he feels a pride in doing whatever he may be called upon to do, because he fears the shame of not doing so, because he has learnt respect for, and has confidence in, the ability of his superior. In the process of training the heterogeneous crowd to become a homogeneous armed force, little things must not be slurred over because at the time they appear to be minor faults. Authority must on no account be abandoned under the mistaken idea that discipline should not be pushed too far. Punishment must follow in due course, though it should be intelligently given. It does not follow that in time of battle or war obedience will only be obtained through fear of punishment. The ideal is obedience born of confidence. It is one of the many lessons that we may learn from the American Civil War, as every reader of Henderson's books will know. The latest writer on the war, himself an eye-witness of it, says* :—"Both armies were made up of volunteers, men wholly unused to military discipline and wholly untrained in that subjection of their own minds and wills to superior authority, which constitutes the distinction between the soldier and the raw recruit, between an army and an armed mob. They retained the unsoldierly habit of thinking and judging for themselves when they should instead have let their officers think and judge for them. They were undisciplined and subject to such fancies as that sort of individual thinking is bound to produce." The confidence which an officer establishes will in great measure be due to his professional ability, to the measures he employs to influence the minds of the men he is training, and to the prestige he himself enjoys. Dr Le Bon says the principal expedients in influencing men's minds are affirmation, repetition, and contagion. "The more concise an affirmation is, the more destitute of every appearance of proof and demonstration, the more weight it carries Affirmation however has no real influence unless it be constantly repeated, The thing affirmed comes by repetition to fix itself in the mind in such a way that it is accepted in the end as a demonstrated truth When an affirmation has been sufficiently repeated and there is unanimity in this repetition, what is called a current of opinion is formed, and the powerful mechanism of contagion intervenes." It is this "contagion" that Bernhardt refers to† in his remarks on the influence of leadership on a cavalry mass. "The task of the leader must be to transmit the mechanical power, inherent in the troops in the form of momentum, upon the enemy. Where he, with a clear purpose before him, acts with daring and thorough comprehension, it is in his power to intensify this momentum many times

* "The History of the Confederate War : its causes and its conduct," by G. C. Eggleston (Heinemann).

† "Cavalry in Future Wars."

over, and this holds true with the cavalry to a greater degree than with any other arm, for with the horsemen the personal impression conveyed by the appearance and bearing of the leader reacts on the mass as in no other case. The reaction is further accentuated by the fact that the excitement of the motion on horseback, inherent in the performance of cavalry duties, contains something electrifying, kindling to the imagination, and exciting to the nerves, which communicates its influence to the leader and then in turn supports him."

Ideas propagated by these expedients acquire in time that mysterious force known as prestige. Prestige is a sort of domination that can be exercised over people's minds equally by an individual, a work, or an idea. Dr. Le Bon shows that prestige may be grouped under two principal heads, acquired prestige, such as results from name, fortune, or reputation, and personal prestige. Personal prestige, Dr. Le Bon says, is something essentially peculiar to the individual; it may co-exist with reputation, glory, and fortune, or be strengthened by them, but it is perfectly capable of existing in their absence.

It is interesting to find that Dr. Le Bon thinks that the English are particularly impressed by the prestige attached to titles and nobility. I am inclined to agree with him. I certainly think that our officers have the advantage of prestige in that the lower classes, from which the ranks of the army come, are impressed with the prestige attached to having gentry as officers. In the case of the Indian army this is still more marked. Indians always have been ruled, and are particularly susceptible to the prestige attached to birth and rank. The power of prestige is extraordinary. Our own history teems with examples of what can be done by its influence. In France it would be a rash man who would say that the Napoleonic legend is yet dead.

I have already touched on the value of confidence being inspired by the leader of a crowd. This is intimately bound up with a manner in which the officer undertakes the education of the men entrusted to his charge. The officer has to his credit, to equip him for the task of teacher, the advantage of a special education which should develop his subconscious power in the right direction. Besides developing the physical qualities of the men he must look to their moral qualities. He must be a living example of duty and discipline, of patriotism and responsibility. He must show interest at all times in the men and their common work, not merely on parade or by perfunctory lectures. He must not fall into the error that because modern war requires a deeper knowledge of what has been written about war, therefore he must be a pedagogue in order to pass on his knowledge to the ranks. He must certainly read to learn, but in dealing with the men it is by practical example and not by theorising that he must educate them. To command and lead men one has not merely to shout an order correctly. There must be a spirit of understanding between leader and led, and

between man and man. Where men are formed in ranks under the eye and hand of their officers they form a body full of power, but when the closed ranks give place to extended order the material value must give place to moral force. A body of men, even disciplined, if it loses its leader is apt to degenerate into a mere crowd. There will always be the struggle between fear, and the habit of discipline. Hence the value of imbuing a force, even used to discipline, with a spirit of comradeship. In this an organization of handy units plays a practical part. One must appreciate the power of control over fire, and the best means of rallying under the nearest officer. The responsibility of an officer increases as the fighting becomes more severe. The ranks of any crowd are keen observers of their leaders and will take the same view of a situation as they. The value of example and, above all, of discipline is great. Troops who are not disciplined in peace will give their leaders away in war.

We all know units which in conversation we dub as "rotter." We all know instinctively, if we do not say so, that it is the fault of the officers of those units. Yet we know that in some cases those officers individually are professionally able, or skilled in athletic exercises, or in the pursuit of game, all of which tend to produce character. I argue that the fault lies in the fact that they unconsciously fail to make use of their abilities to influence their men, and that this is through ignorance of the characteristics of the crowd-mind, and of the power that is within their grasp.

HAND-GRENADES IN THE RUSSO-JAPANESE WAR.

Translated from the Voenni Sbornik, January 1910.

COMMUNICATED BY THE GENERAL STAFF, WAR OFFICE.

A long-forgotten weapon, which for years had rusted uselessly in our arsenals, was re-introduced in the recent war. This was the hand-grenade. As a result of the peculiar character of the operations grenades were much used, and under certain circumstances, especially at Port Arthur, their employment produced a decisive effect. Scarcely any other weapon was thought of when the enemy was met in deep ditches or had to be driven out of strongly-casemated buildings; and, generally speaking, they were of the greatest value in all hand-to-hand fighting.

It might be urged that the re-appearance of grenades was only ephemeral, that it was due to the exceptional conditions of the war, and will not be repeated. But this view will not bear examination. Careful study of the war shows that with the development of quick-firing weapons, troops in action involuntarily strive to increase the intensity of their fire and to protect themselves.

The Japanese infantry, which is of the best, carried bags which they sometimes filled with earth in order to protect themselves from fire, and their firing lines often entrenched themselves.

In future we shall seldom see great battles which last only a few hours, like Leuthen and Rossbach, or a single day, like Mars la Tour, Gravelotte, etc. Field fortification is coming to its own. A force which holds a defensive position, strengthens it with all the contrivances of military engineering science. The attacker, in order to crush his enemy, must resort to close combat, and here the hand-grenade comes in. It is indispensable both in fortress and in field warfare, and probably all Powers will re-introduce it.

The use of the grenade dates from the 15th century. In the 17th, it was a favorite weapon, but since the 18th its popularity has declined. Both French and Russians used it at Sevastopol, as did the British in the Soudan, 1884-85. In the last war it was first used at Port Arthur, in August 1904, and from that time it became the principal weapon at close quarters. The Russian grenades were at first improvised from old iron cases or mountain artillery shells. Later, the brass cases of quick-firing artillery, cut down to a height of four inches, were pressed into the service. They were filled with dynamite or gun-cotton, and were fitted with an ordinary Bickford's fuze burning 15 seconds. The first Japanese grenades were made from old preserve-tins or bamboo tubes filled with a pound of gun-cotton, and with a similar fuze. When first introduced, the fuzes were often cut too long, and the grenades were thrown back by the

enemy. It was lighted with ordinary matches, but later on a rough percussion arrangement was improvised by means of a rifle cartridge, which acted as a primer, and steel wire.

Having once realised the value of grenades, both belligerents naturally sought to extend their sphere of action. Wooden mortars were introduced which threw bombs up to a range of 233 yards. These mortar tubes, which were of about 5 inches calibre, were fitted to a wooden stand and were given a constant elevation of 45°. Ranges of from 58 yards to the limit already mentioned were obtained by varying the propelling charge.

The Japanese invented a very powerful grenade by packing a prism of picric acid between two cakes of gun-cotton. The whole was wrapped in paper tied with string and weighed about one pound. A Bickford's fuze with a fulminate primer was attached, and was lighted by means of tinder. This bomb was carried in a bag slung round the neck.

The Russians used various high explosives in their grenades, such as "Sampson" blasting powder, "Raskaruk," and "Divine's Explosive." The charge was covered with a coating of pitch, and was fired by means of a Bickford's fuze with fulminate primer. The bodies of old Japanese shrapnel were also used as cases. Each body was packed with two cakes of gun-cotton held in place by a piece of wood, and was fired by means of the usual fuze and primer. A soft-headed match was embedded in the end of the fuze, its head being covered with wadding for safety.

The Russian workshops in Port Arthur could turn out 2,500 grenades in 24 hours. In the month of August alone 18,000 grenades were prepared.

The men had great faith in them, and would often drop their rifles so as to have their hands free for throwing.

Grenades were also extensively employed in the field armies. At Mukden the Japanese used a metal cylinder fitted with a wooden handle and with percussion action. Vertical impact was secured by means of a leaden ring round one end of the cylinder. After Mukden a pattern was adopted which had thick walls and no leaden ring; vertical impact being obtained by means of a guide-tape fastened to the handle. The Russian patterns were generally similar in construction to the Japanese, and had much the same percussion arrangement. The weight of both Russian and Japanese grenades was from one to two pounds.

On both sides, the percussion grenades proved to be by far the best, especially those which were fitted with a safety arrangement. The grenades fired by means of a Bickford's fuze were unsatisfactory, the matches or tinder used to light the fuze often failing owing to damp or other causes. The fuze itself also required careful handling. The percussion grenades were thrown by means of the handle up to a distance of 60 paces. Leaden rings round the grenade flew in fragments such a distance upon impact that they were dangerous to the thrower.

Grenades have a two-fold effect, produced by the force of the gases generated, and by splinters. The large bombs weighing from 3 to 4 lbs., with thick envelopes, had a great effect both from gases and splinters. These were used at Port Arthur. The effect of the smaller grenades used in field warfare was chiefly moral, although those nearest the burst were killed by the gases, and others were severely hurt by splinters. The radius of action of these small grenades was from 20 to 30 paces.

The correspondent of the *Daily Mail* on the Japanese side at Port Arthur gives a striking account of the effect of large grenades at 203 Metre Hill. In one instance, 15 to 20 corpses lay in a heap, terribly mangled, and in some instances with the uniforms torn off by the force of the explosion. All this was caused by one dynamite bomb. Further on, the dead lay in hundreds, often in groups of from 10 to 15, mown down by the grenades. According to Osten-Sacken, the effect of a heavy bomb falling in a trench was such that the assault of the attacker was greatly facilitated. Similarly, a few grenades thrown among the assaulting troops may effectively repel them. In either case, troops take some time to recover from the mental shock.

Thus, light grenades of from 1 to 2 lbs., with thin envelopes, are quite sufficient for moral effect, and, being comparatively light, field troops may be equipped with them. The heavy grenades of from 3 to 4 lbs., with thick envelopes, are best for material effect, and should be reserved for fortress warfare.

At Port Arthur the Japanese frequently used grenades for the purpose of preparing the assault, especially when the opponent was sheltered in blindages or behind high parapets. Thus the 7th Regiment when assaulting East Pan-Lung-Shan on the 9/22nd August. The previous day all its attacks had been repulsed, and only a small detachment managed to find cover in an entrenchment which had been evacuated by the Russians. Here the detachment passed the night. The following day, the officers resolved to attack the fort, as retreat was impossible. The engineers who were with the detachment had a few hand-grenades and were sent in advance. They speedily scaled the parapet and threw their grenades. Some blindages and a machine gun were destroyed, and the fort was won after a fierce struggle.

The Japanese soldier, when assaulting, always had a few grenades with him and carried his rifle in his left hand. Thus the assault itself was prepared by throwing hand-grenades with a view to demoralising the enemy. This was well illustrated at 180 Metre Hill, which had two tiers of trenches and was armed with heavy and machine guns. On the 7/20th September the Japanese took the lower tier of trenches, but failed to capture the upper one. The next day, after a thorough artillery preparation, the 1st Regiment assaulted the upper tier. As soon as the Japanese arrived within bayonet distance they began throwing grenades. The Russians were completely demoralised, and the hill was taken after a brief struggle.

When fighting hand-to-hand both sides used grenades, throwing down their rifles for this purpose, *e.g.*, at 203 Metre Hill.

The Japanese also found them very useful for the purpose of clearing counterscarp galleries after crowning the glacis. Thus at Ki-kuan-shan on the 18/31st October.

The Russians made great use of grenades for defending outer ditches which were without flank defence, *e.g.*, at the Shui-hsin Redoubts on the 6/19th September. A body of the enemy penetrated to the outer ditch, where our fire could not reach it, but it was subsequently destroyed by means of grenades thrown into the ditch. Grenades were generally used to repel assaults.

On the 10/23rd November the Japanese attempted to storm the "Trench of Death," which connected forts Ki-kuan-shan and Kobu. Their parallel was within 50 paces of the trench, but could not be worked further because the ground was steep, and the workers were destroyed by means of grenades thrown from small mortars. As soon as the enemy rushed forward with the bayonet they were met and repulsed by a hail of lead and hand-grenades.

Russian reconnoitring patrols at Port Arthur usually carried grenades.

During the winter halt on the Sha Ho the outposts were equipped with grenades for the purpose of dealing with minor hostile attacks, and when storming the Russian works at Mukden, each Japanese company had from 4 to 10 volunteer grenadiers. These advanced with the parties told off to destroy obstacles and, when the latter were reached, threw their missiles into the Russian works. The Japanese engineers, thus covered, were then able to destroy the obstacles. The task of the Japanese was facilitated by the mistake made by the Russians in placing the obstacles too near the works.

The Japanese cavalry was also armed with grenades, and, when pursued by Russian cavalry, threw them under the horses of the latter.

We may, then, conclude that hand-grenades can be used with advantage and under the conditions enumerated below:—

- I.—In the assault, to clear trenches strongly occupied by the defence. The grenades can be thrown when on the move, and, producing both moral and material effect, may effectually prepare the assault and assist the stormers to cross the last 60 to 100 paces separating them from the enemy.
- II.—In hand-to-hand fighting.
- III.—To facilitate the destruction of artificial obstacles. Covering parties throw grenades, while engineers in rear carry out the actual demolition.
- IV.—To drive the defender out of permanent fortifications. To bring up guns is impossible, to destroy the work is difficult. A well thrown grenade may kill all its defenders.
- V.—In the defence of fortified positions. When the stormers advance in waves, they may be brought to a standstill by the use of grenades.

- VI.—In the defence of fortified works, to prevent the approach of parallels and saps beyond a certain point. The attacker, protected by sand-bags and parapets, is almost invulnerable to rifle fire, and artillery fire cannot be employed.
- VII.—To assist the defence of an outpost line when that of the enemy is near. Reconnoitring patrols may also be equipped with grenades.
- VIII.—Cavalry may carry them with advantage.

If the various uses of hand-grenades enumerated above be recognised, it is obvious that troops should be carefully trained in the handling of them during time of peace.

A. BORTNOVSKI.

THE REMOUNT PROBLEM IN AUSTRALIA FOR INDIAN SILLADAR CAVALRY REGIMENTS.

BY LIEUTENANT G. DE LA POER BERESFORD, 10TH LANCERS.

It may seem somewhat late to begin discussing the above problem when the present system of breeding horses in India from Government lines and privately owned mares has already been proved so successful, and promises to fulfil the requirements of the Army in India at no distant date.

The value of the country-bred is a known quantity, but in corps that are mounted on a mixture of Walers and country-breds, there are many who favour the former and not a few of the native ranks are loud in the praises of the Waler, despite the extra trouble entailed in training him and his inability to grow fat on a varied assortment of cattle foods when his owner is on furlough.

We are told that the Waler remount market in Calcutta and Bombay is getting smaller, and that every year suitable remounts are more and more difficult to get.

If this is the case, regiments now buying Walers will soon have to have recourse to country-breds, with—what result? There will be an immediate increase in the prices of country-breds all round, and moreover, the regiments buying three and four-year-old country-breds instead of Walers will be at a serious disadvantage, in that the class from which they will get their remounts will have been picked over as yearlings and two-year olds.

Now is the time for a combine on the part of a number of regiments of native cavalry to step in and secure their position in the Australian market instead of having to begin buying country-breds in a market in which the zemindar will be the sole supplier.

If the Australian source of supply can be stimulated by the establishment of depôts for the supply of remounts, it is obvious that a general cheapening of country-bred remounts in India will ensue; or at least, if a number of regiments arrange for the supply of remounts from Australia, rather than from India, the prices in this country will not be as dear as they might have been. People who know Queensland are unanimous in saying that the general type of Waler in the native cavalry is not as good as it ought to be.

Bearing this in mind it is the object of the writer to show that—

"A." There are plenty of horses of the right stamp in Australia.

"B." That it is possible to land these horses in India at the same price now paid for an indifferent class of Waler.

"C." That the continuance of the use of Walers as remounts for native cavalry will have the effect of cheapening the country-bred for regiments which have farms in India, and of course by cheapening them it will mean that a better class of horse will be bought.

For the sake of brevity, a scheme has been outlined dealing with an imaginary dépôt established in Queensland for the purpose of supplying remounts for the Indian cavalry market.

It is proposed to discuss the question of establishing remount depôts in Queensland only, for the reason that it is no longer possible to obtain land in many of the other Australian States at a price that would render the scheme workable.

The organization of depôts for the breeding of remounts, though eminently desirable, would be too costly, and too slow to start, to be undertaken by saddle cavalry. It is therefore proposed merely to purchase suitable horses and subsist them in Queensland till they are ready for shipment.

Probably the most suitable locality for depôts would be within a radius of 150 miles of Townsville. This port is now largely used by Indian horse-buyers, and I believe horses are kept by the dealers on stations near there, sometimes for two years.

Townsville is a port of call for large vessels and is centrally situated with regard to the Western Downs District of Queensland. Horses bred on these downs are always good, as the country is limestone and contains a certain amount of high and stony ground.

There is also another point in favour of this region, *viz*, it is too far from the agricultural districts of N. S. Wales and Victoria to be a source of supply of farm horses, and a good stamp of horse is bred for saddle and light harness work as opposed to a heavier and coarser animal, the outcome of the use of trotting and Suffolk Punch strains to produce a general utility horse.

At the present time the greater portion of Queensland is held under various forms of lease from the State, and there are large areas of excellent land near the coast constantly reverting to the Crown to be released. This class of land is better suited for large stock, which are not nearly so profitable as sheep, and is consequently not so eagerly sought after as land in the sheep-raising areas.

From time to time stations revert to the Crown, and in these we have depôts ready made. The only thing to be actually paid for is the value of the improvements, which comprise homestead buildings and men's quarters, fencing, and water conservation arrangements.

The present rate for grazing land of the class required may be safely put down at one penny per acre per annum. It is probable that the Queensland Government if approached would grant valuable concessions in the matter of land for forming depôts.

Regarding the acquisition of land, it is important to note that within the last ten years the price of land in the Australian States has been at least doubled, and everything points to a further increase in its value. Queensland is as yet very thinly populated, and the increase in the price of land has not yet been felt there. It is, however, only a question of time when the whole of Queensland will become freehold, and the purchase of land for depôts for native cavalry would be far too costly an undertaking to be thought of.

The various methods of acquiring land from the Crown are too complicated to be discussed here, but it may fairly be assumed that one penny per acre per annum would be the average rental. There is, however, reason to suppose that the Queensland Government would

be willing to give sufficient land free or at least on particularly easy terms.

For the purpose of proving the feasibility of the scheme, it is proposed to take a *depôt* capable of carrying 2,000 horses and of supplying 10 regiments with remounts at the rate of 70 horses per regiment per annum.

It is assumed that a cattle station has been obtained in the Townsville district, *i.e.*, a grazing property of 120,000 to 150,000 acres of securely fenced land with a homestead and cattle yards with permanent water. It would probably comprise some few hundred acres freehold land, with permanent water, on which the more costly improvements were erected, and the balance annual leasehold land with a rental of £500 per annum (this is a very liberal figure). It is probable that the whole of the improvements, plant, etc., would go with the property for £1,000, and we may put down 2,000 acres freehold land at £1 per acre, *i.e.*, total initial cost £3,000.

The annual cost of working the *depôt* would be approximately as follows:—

	<i>Depôt.</i>	£
Manager	...	150
Head stockman	...	90
Two stockmen, at £75	...	150
One extra man at homestead	...	50
One cook	...	60
Incidental expenses at homestead	...	100
Minor improvements, fencing, etc.	...	200
Rations, 6 men, at £20 per head	...	120
		<hr/>
	Total	£920

The question of expenses incurred by officers deputed to buy horses will be dealt with later, also rent payable to the Crown and interest on original outlay

It may at first appear that the size of the *depôt* is too great, and that the expenses are put down at too low a figure; they, are, however, based on information from people well acquainted with Queensland.

It is proposed that the *depôt* should be capable of subsisting at all times 2,000 horses, and it is claimed that this number will be necessary, so that a really good draft of 700 could be chosen each year.

The 2,000 horses would be made up as follows:—

Age 1 year	...	20 foals dropped by mares at <i>depôt</i> .
" 2 years	...	300
" 3 years	...	600
" 4 years	...	800
" 5 years	...	300
		<hr/>
Total	...	2,020

Before discussing the buying of horses the question arises "Who will buy the horses and where?" It is suggested that there are many officers in native cavalry competent to buy, aided by the depôt manager. It might be as well to ask also, "Where will the money be found to buy 2,000 horses?" Why from Government, in the cases of regiments that are only able to exist from hand to mouth, and from the *chunda* of wealthy regiments, with a due allowance of interest from a central fund.

It is claimed that horses of a type at least 50 per cent. better than those now supplied to native cavalry can be bought in Queensland and landed on a depôt near Townsville at an average cost of £10 per head. Various estimates by Queensland men of the value of the present native cavalry remounts landed at the coast have been obtained, and they average £7 per head. Dealers will doubtless scoff at this, but they prefer to neglect to notice the animals which they call "Bounders" when in Queensland and polo ponies in India.

Before going further, it is necessary to review the present source of supply of remounts for native cavalry.

Dealers go inland to buy, or buy at horse sales near the coast, animals which may be divided into the following three classes:—

I.—All good-looking, well bred horses, which, if not sold as paperchasers, pigstickers, or officers' chargers, will easily pass as remounts for horse artillery or British cavalry.

II.—Horses of the above description, but not so good looking and well bred. It is hoped that most of them will pass as "Government horses," any that don't pass will probably be taken by native cavalry.

III.—All sorts and conditions of small horses; of these, the breedier looking ones that measure 14-1 after a hard voyage are easily saleable as polo ponies at good average prices.

Class III, robbed of many of its best horses, and the rejects of class I and II, form the chief source of supply of remounts for native cavalry.

Many of the horses of class III are those bred on stations in the hands of the banks or money-lending companies which have foreclosed on properties and have let the stock on them absolutely run wild. Coarse under-bred horses are left as stallions, and cover mares with the result that the foal becomes a typical Rs. 350 native cavalry horse which is too well known to call for description here.

It is therefore plain that we are buying our horses in what amounts to a market of casters.

Were we to send our buyers further afield than Calcutta, *viz.*, to the Western Downs of Queensland, it is believed that they would have no difficulty in getting plenty of really good horses, and moreover, the horse-breeders in that part of the world would soon take steps to supply what was wanted when they saw a market assured.

Having bought horses inland, very little expense is incurred in bringing them to the coastal depôt, as the Lands Department provides grazing free for travelling stock on numerous routes all over Queensland.

A specimen annual statement of accounts is given as an appendix on page 542. From this it appears that, at our present price, a remount of better quality than we now get can be landed in Calcutta or Bombay with a fair margin of profit.

A fallacy occurs in the estimate, since interest has been included twice on a sum of £3,000, the initial cost of the station. It is, however, better to err on the side of expenses. The maintenance of some 1,300 to 2,000 horses at the depôt seems extravagant, but is conducive to the best results, and, neglecting the present Field Service Regulations on the subject, forms a valuable reserve supply of remounts to draw on in case of war.

It is also to be noted that fatal epidemics amongst horses are far less frequent (if not unknown) in Queensland than in India, and, moreover, a dead horse there represents a loss of £10, in India at least £20.

With regard to the scheme, the most important thing is the necessity of acting within the next few years, for the simple reason that land will not be obtainable after ten years, and will probably cost double in five years' time what it would cost to-day.

In the above article it is claimed that the great advantage of the scheme lies in the fact that a superior type of horse to that now supplied by private enterprise can be got for the same price by a co-operative system, with a margin for profit or to cover losses occurring in some unaccountable way.

There are doubtless questions of finance that would have to be overcome, but the opinion of several people who know Queensland well is that the initial cost of horses, working expenses, and all other figures are fair estimates, and that the scheme is workable and in the main correct.

Numerous objections have been put forward, one of which might be mentioned. "Would not remount buyers combine against the native cavalry buyers in Queensland?" The number of horses in Queensland is so great that this is on the face of it absurd when the annual requirements of native cavalry are taken into account.

The native cavalry buyer, with a depôt for the reception of his horses, can buy when and where he likes; moreover, the shipper who now claims that there is no profit in what he calls "Bounders," would have no object in buying horses of that class, when once a combine of native cavalry began to buy them; because, having bought them, his market in India would no longer exist.

I am indebted to Major J. K. Forsyth of the Australian Forces for having very kindly criticised the above scheme.

APPENDIX.

RECEIPTS.	EXPENDITURE.
£ s. d.	£ s. d.
From 700 horses sold at £25 per head landed in Calcutta ... 17,500 0 0	Interest to £3,000 original outlay in purchase of Sta- tion to form depôt, at 5 per cent ... 150 0 0
	Expenses of Officer deputed to buy horses ... 200 0 0
	Interest on £13,000, the cost of 1,300 horses, at £10 per head left at depôt ... 650 0 0
	Interest on cost of 700 horses at £10, say for 6 months, 175 0 0
	700 horses added to depôt to replace 700 shipped to Calcutta, at £10 per head 7,000 0 0
	To Shipping Company, freight on 700 horses to Calcutta at £7 per head ... 4,900 0 0
	Feed and attendance on 700 horses ... 1,200 0 0
	Working expenses of depôt as per page 539... 920 0 0
	Rent of depôt payable to Crown ... 500 0 0
	Balance from which to meet losses caused by deaths, etc., remainders to be added to a sinking fund. 1,805 0 0
Total £ ... 17,500 0 0	Total £ ... 17,500 0 0

TREE-CLIMBING—A SUGGESTION.

BY CAPTAIN H. W. KETTLEWELL, THE KING'S SHROPSHIRE
LIGHT INFANTRY.

It is a platitude that, given two forces equal in other respects the one which makes the best use of its ingenuity and intelligence will beat the other: and yet, can we rest assured that in the organization, equipment, and training of our Army we have given and continue to give these faculties full play? We are as a nation proverbially conservative, and often wait for other Powers to test the efficacy of a new measure before following their lead. No doubt this tendency is encouraged by a laudable desire for economy; but it is the feeling that the experiment advocated in the following lines will involve no expenditure that cannot be met out of regimental funds which induces me to put it forward for the consideration of officers in India.

The majority of units in India are serving in districts that possess few topographical features from which an, in any way, extensive view of the surrounding country can be obtained. An endless succession of dhal, sugar-cane, and paddy-fields, without even an ant-heap whereby to add the wished-for cubit to one's stature, describes a terrain which is familiar to most of us.

How often during manœuvres and after field-days do we hear remarks, such as:—"Directly X Company got more than 400 yards away on the right, I never saw them again," or "I had no idea, sir, that Z Troop were so close in support, or else I would never have retired." To establish and maintain inter-communication, to see without being seen, are problems which we feel are at times insoluble on the plains of India.

Yet, are there no means of obtaining those few feet of command and so possessing ourselves of the information we so badly need? We read of balloons and military kites; but most of us have never seen either. Aeroplanes and dirigibles are scarcely to be depended upon as yet. But what of the trees? Yes, there are plenty of them; but we gaze sadly at our heavy marching boots and reflect wistfully on the bygone days of boyhood when lightly clad and rubber-shod we ravaged the nests of magpie and kestrel. Could not the men, perhaps, be persuaded to risk the climb? No. Their boots are even less suitable than ours, while their equipment would hamper them; and the only result would be a Court of Enquiry to investigate the cause of a certain lamentable accident. So we desist, and sink once more into our former state of apathy. Those trees can be climbed, however, and should be climbed: the men, or some of them at least, should be suitably shod, equipped and trained for the feat.

Having once, then, established the truth of this discovery, it only remains to discuss the details necessary for giving it effect.

Firstly, as to the numbers of men to be trained as tree-climbers. Two to four per company or battery, or say, twenty and a N.-C. O. available from a battalion, would ensure every company or double company commander being provided with one or two tree-climbers, while a selected few, say, four under the N.-C. O., would be at the disposal of the Commanding Officer. These numbers are merely suggested: but those men trained for the use of the Commanding Officer would be of first importance; and should these answer expectations, the number of men so trained could be gradually expanded.

Secondly, as to equipment and training. Stout footgear, while necessarily retained on the march, must be replaced, for tree-climbing, by a light flexible shoe, a pair to be carried by each climber. Canvas uppers, and strong corrugated rubber soles would give the best result; but for climatic reasons rubber might have to be replaced by some other material, such as a sole of the moccasin type or of rope. In order quickly to change their marching footwear to these light shoes, tree-climbers would have to be provided with marching shoes and khaki stockings (these could be knitted regimentally) in lieu of boots and puttees, while the light shoes could be carried strapped to the belt. Such trees as palms and cotton trees, with long straight stems, would still defeat the efforts of the most adept climber: so light climbing irons, of the familiar pattern of our boyhood, and made by the regimental armourer, would have to be carried.

To supplement these, a jointed bamboo pole—an 80lb. tent supplies the pattern—made by the regimental pioneers and fitted with projecting ledges or steps, could be carried stretcher-wise by two men, or two five-foot joints by each man in lieu of a rifle. Four joints of five feet each would produce a ladder twenty feet in length, sufficient to enable a climber to reach the lower branches of most trees. Should a tree present further difficulties, the bamboo ladder could be pulled up after the climber had reached the lower branches and re-erected upon them, thus enabling the climber to reach a height of forty feet in two spans. Arrived at this height and armed with a pair of good field-glasses and a small megaphone, an observer would be of inestimable value to an officer standing below. In the ordinary terrains of the plains a Commanding Officer, stationed between two adjacent fifty-foot trees, in each of which was seated a trained observer, would be kept informed of the movements of each company, while every movement of the enemy could be observed and reported at a distance of two miles and over. To battery commanders, a tree-climbing observer of this description would be of incalculable value. Given that subordinate commanders know the whereabouts of their chief, messages and orders could be transmitted by signal between them through the medium of the latter's observers, or between the respective observers of each. Whether climbers should carry rifles would be shown by experience: their ammunition could, at any rate, be safely reduced to a very few rounds. Men endowed with the necessary agility and

keenness, who would gladly submit themselves to such a novel and interesting course of training, would be found in every regiment. They would have to undergo a specially designed gymnastic course, while the out-door training in the trees themselves, facilities for which exist in every cantonment in India, would have to be strictly progressive, until nerves, hands, and feet were well able to stand the strain placed upon them: otherwise discouraging accidents would inevitably condemn the whole project. Methodical and accurate observation at ever-increasing distances, with careful transmission (either verbally or by signal) of information so gained would be special features of the course. A small, short signal flag, used single-handed, could be issued to climbers, while a small megaphone, as mentioned above, could be advantageously employed. In addition to tree-climbers, who would be accessory to company and unit commanders, ordinary regimental scouts, though not equipped exclusively for tree-climbing, should and could have more time devoted to the cultivation of their tree-climbing propensities than is now the case. The rôles of the scouts and tree-climbers should be kept, however, quite distinct: for while the action of the former is independent and involves constant and rapid movement in forward positions, the action of the latter would be dependent on the officers they attended, and, though involving great agility, would be generally stationary and confined to positions much less advanced. It is difficult to see how, with several pairs of well trained eyes placed at a height of fifty feet and more from the ground *within* a unit, the maintenance of so large a body of scouts as is now employed, would be necessary *beyond* the unit. Thus, it is contended that the presence of well trained and equipped tree-climbers with a force would tend to decrease the number of ground scouts and so place a larger number of rifles at the disposal of company and regimental commanders.

I submit that the ideas briefly sketched above embody a feasible scheme which will not only add to the interest of peace manœuvres in the plains of India, but will enhance the fighting value of the units which garrison them.

PRECIS OF FOREIGN MILITARY PAPERS.

THE CHINESE ARMY IN 1910.

From "La Revue Militaire des Armées Etrangères."

The May number of the "*Revue Militaire des Armées Etrangères*" contains an interesting paper on the state of the Chinese Army in March 1910. Its composition is stated to be as follows:—

The new Regular Army.

The Auxiliary Police Army.

The Modern Police Army.

Manchu Contingents.

The remains of the old Army of the Green Standard.

Local Militias.

Mongolian and Tibetan Contingents.

Riverain troops.

Except the modern police army, all the above are under the control of the Minister of War and the Chinese General Staff.

The Emperor has been proclaimed Commander-in-Chief of all naval and military forces. During his minority, the Prince Regent will act for him. Viceroys and Governors of provinces have no longer any authority over the New Army. They have been deprived of their old title of General-in-Chief and their duties in future will be purely civil.

The Prince Regent has created a General Staff of National Defence, which will issue instructions to both Army and Navy Ministers, the latter being charged with their execution. It is the duty of the General Staff to prepare plans of operations and to nominate generals, admirals, and staff officers to hold command in time of war. The Minister of War has been deprived of the control of the General Staff, and also of the Naval Section, which was provisionally under his orders. The latter section is transformed into a Committee of Naval Reorganization and will eventually become a Naval Ministry. The question of removing the control of military instruction for the Minister of War and placing it under the General Staff is still under consideration.

The General Staff is under Prince Tsai Tao, the Prince Regent's brother; the Committee of Naval Reorganization is directed by Prince Tsai Hsun, another brother of the Prince Regent. The former is at present engaged in a tour of study of the armies of America, Europe, and Japan; the latter has just completed a general inspection of the Chinese maritime forces, and has also made a rapid tour of various foreign navies. These two princes, aged respectively 26 and 25, have for the last two years regularly attended the military conferences held at Peking for Chinese marshals and members of the Royal Family. Prince Tsai Tao is aided by generals who have received their military education in Japan.

By an imperial decree, dated September 1909, the status of army officers has been materially improved. Military and civil officers have been placed on the same footing, and pensions sanctioned equal to one half the pay drawn whilst on the active list. Field-marshal have been created.

No commissions will in future be given by Viceroy or Governors of provinces. Nominations will be reserved for cadets in the military schools who have passed the necessary examinations and have been attached to regiments at Peking for a period of three months. Commissions will be granted by the Sovereign alone on the recommendation of the Minister of War.

A table has been prepared showing the various civil grades with which military officers will in future rank. On transfer to the civil, military officers will hold the corresponding civil rank. It is evident that this decree must strengthen the loyalty of the army to the Emperor. It puts an end to the feelings of contempt with which the profession of arms has hitherto been regarded by Chinese civil officials, the educated classes, and the people at large. The army has indeed been accorded valuable privileges.

One of the most promising features of the new régime in China is the number of military schools that have been created. In Japan, also, there are at present some 500 Chinese military students. Higher military education is receiving attention; but the new staff college will not be open till 1916.

Amongst the commissioned ranks especially, real progress has been made. Officers are made to work and the lazy ones superannuated. At the same time their numbers are well up to strength.

The numbers of the new Regular Army at present serving with the colours are as under:—

Infantry (including personnel of 74 machine guns)	...	...	117,750
Cavalry	...	...	8,240
Artillery (780 guns)	...	...	13,700
Engineers...	...	...	6,875
Army Service Corps, etc	...	...	6,000
Total			152,565

Out of this total, 120,000 men may be said to be fit for active service.

A reserve of ten battalions exists, formed of men who have completed three years' service with the colours. They do one month's training a year. Service in the regular army is at present voluntary. The quality of recruits is better than before, the number of opium-smokers in the Regular Army being small. The auxiliary forces may be considered as an additional reserve.

The creation of the 4th Manchurian Division has been postponed for want of funds. The Canton Division has been disbanded on account of a mutiny which was pitilessly suppressed by the auxiliary police army.

The mixed brigade at Ngashoi, which had been disbanded for mutiny in 1908, has now been reconstituted.

By October 1912, it is hoped that 36 divisions will be formed. Each division will be allotted a battalion of 24 machine guns (in 4 companies) and a battalion of communication troops (railway, telegraph, balloon, bridging sections).

The remount service is being organized. There are at present three remount depôts, one in Chinese Turkestan and two in Mongolia. Generally speaking, horses in the Chinese army are badly looked after; the wastage is consequently high. Veterinary officers are few in number and quite inexperienced.

The Chinese make their own rifles and ammunition. There are three factories which turn out 65 rifles and 115,000 cartridges daily. A fourth factory is being constructed. No quick-firing guns have yet been manufactured in the Chinese arsenals. In 1909 many Q.-F. guns were imported from Germany.

The Pay, Supply, and Transport departments are still in their infancy. In 1909 great efforts were made to become independent of foreign countries for the supply of military clothing and equipment. Private and state shops and factories are competing with German and Japanese firms. Near Peking a cloth factory has been started. Military sanitation and medical arrangements have made certain progress. Each division has a small hospital attached. There are six schools for army doctors, only one of which, however, is of any real value.

FIGHTING VALUE OF THE NEW ARMY.

The New Army drills well in close order and carries out manoeuvres with rapidity and precision. The infantry make good use of the ground, but are poor shots. The cavalry are badly trained; horsemanship is bad; the cavalry spirit does not exist. The artillery do not practise fire sufficiently and consequently are unable to use their Q.-F. guns to the best advantage. The engineers are comparatively efficient. Young generals begin to understand the principles of manoeuvre, but their operations are too stereotyped. Discipline is lax. In short, in spite of the great progress made since 1903, especially in the system of military schools, the Chinese Army cannot yet be classed amongst the modern armies of to-day. Its officers and N.-C. O.'s are new, high commanders and staffs inexperienced, departmental services still in embryo, the armament of the artillery varied, fire instruction poor, supply of ammunition insufficient, and the remount service defective.

The system of territorial recruiting is, moreover, unsuited to Chinese requirements.

In spite of these flaws the new troops are a great improvement on the old, and may, if they remain true to their salt, act as an effective police in China itself. On service they will doubtless be of more value than in 1900, especially in a defensive rôle, though it is improbable they that could resist a European or Japanese force for long.

CORRESPONDENCE.

The Question of a *Lingua Franca* for the Indian Army.

SIR,—In F. O. I. A.'s article in the July Journal, under the heading "Reflections on the training of British and Native troops," he expresses the hope that others will come forward with opinions on the subject of a *lingua franca* in the Native Army and of the colloquial training of the British officers of that branch of the Service. I think the matter so urgent that I write at once to say that I for one am in almost total agreement with F. O.

We already have a *lingua franca* in Urdu, and I was under the impression that an order exists as to its general use. But if so, it is an order that is to a large extent a dead letter, although barely two years ago I heard a distinguished brigade commander check a C. O. for allowing Pushtu to be used in "explanations" at squad drill of trained sepoy.

The tendency to drop the use of Urdu for the dialect of the men is most noticeable, is growing, and is encouraged by the rules about obligatory tests. This tendency arises partly from the laudable desire to get into closer touch with the men, but it goes too far, because Urdu is dropped, and plenty of young officers are really better linguists in Pushtu or Punjabi, especially the former, than in Urdu. If then officers encourage the use of these languages, and at the same time drop Urdu, it is only natural that the men should meet them more than half-way. All instruction and official work should be in Urdu, and the men encouraged to talk it at other times. In one corps I used to know, in which there was a large proportion of Pathans, Pushtu was the only language recognised in the orderly room when dealing with these men.

I am not prepared to go so far as to back up F. O. in his suggestion that recruits who show no aptitude for Urdu should be liable for discharge on that account, but certainly sepoy before promotion should know that language sufficiently well. With regard to the Roman character too, I am all in accord with him, but one must hurry slowly. Urdu must first be more distinctly recognised as the compulsory colloquial language, and even then time must be given. I have myself been obliged to limit the compulsory knowledge of "Roman" to candidates for 1st class certificates only. For the others it is at present hopeless.

The average colloquial knowledge of Urdu among British officers, especially of course the juniors, leaves much to be desired, and their pronunciation is even worse. The colloquial test for any standard of Hindustani does not apparently involve a test of pronunciation. No officer who has not a good command of colloquial Urdu, and who does not pronounce intelligibly, should be appointed adjutant or D. C. C.

The obligatory test should be abolished. It is really no test at all, and has ill effects in another way. A young officer as soon as he has passed H. S. Urdu, takes up his obligatory test. He drops Urdu now for good, because there are no more exams in that language. Having started Pushtu, say, in his obligatory test, he is attracted by the high reward offered for H. S. Pushtu, and works on at that language. The test is pretty severe, so he has to know more Pushtu than ever he knew of Urdu, and the reward is enough not to discourage him after a failure or two. Thus he spends a lot of time on Pushtu which would far better have been spent on Urdu. Persian, which is most useful as assisting in the knowledge of Urdu, is not very popular, because it does not come among the obligatory tests.

The obligatory tests are very arbitrary, as a glance at the Regulations will show. One company of Pathans in a regiment is generally sufficient to ensure Pushtu being the obligatory language for that regiment, be the remainder of the companies what they may.

Lastly, what F. O. says about the various Training Manuals is perfectly true. What the men want is the pith of these books in the simplest language possible. An officer of my acquaintance has compiled just such a book as is required, but it is not known outside his own corps. The present Manuals are not understood, and therefore are not read.

C. O., I. A.

SIR,—Briefly put, F. O.'s argument in his paper in the *July Journal* is that Hindustani should be the universal language of Indian troops, that the vernaculars of the different races of which respective regiments are composed should be dropped from the curriculum of training, and that a higher standard of Hindustani should be demanded and enforced among both officers and men in all regiments, irrespective of whether their actual vernacular is Hindustani or otherwise. F. O. very correctly opines that there may be disagreement on the several points raised by him and invites discussion of the subject.

As one holding a directly contrary opinion to F. O. on this subject, I hope I may be permitted to give my reasons for directly traversing his statements, and stating in as few words as possible why I consider his suggestions would not only fail to make for greater efficiency, but would, if carried out, have a pernicious effect on the Indian Army. In doing this I have no desire to treat F. O.'s article in a spirit of carping criticism, but it is as well to make clear at the outset that I believe his argument to be founded on wrong premises, and his conclusions entirely erroneous. I will now proceed to give my reasons for holding this view.

F. O. starts his argument with the following hypothetical case:—
 "It may well happen, nay, certainly will happen, and often moreover, that a party of Gurkhas, Sikhs, Pathans or other combination, finds itself in a tight place. Instant action alone can save the situation. How is such action to be started without fatal delay when the

commander's orders have to be communicated in "as many languages as there are races in the party?"—Now, personally I lack the imagination necessary for conceiving the possibility and still less the probability of this Tower of Babel dilemma arising, with the whole party's safety dependent on the orders of a commander who can only convey his intentions in dumb show. Granting, however, that such an extraordinary situation ever did happen, it does not seem to occur to F. O. that in such a case the best *lingua franca* to use would be the words of the drill book conveyed in plain English, which would be understood and instantly acted on without the intervention of a polyglot interpreter. He could close or extend, advance or retire, open or withhold fire, etc., in fact carry out practically any manœuvre immediately necessary to deal with the situation, without any other aid than the stereotyped English words of command which every sepoy knows and can act on. This little but important omission on the part of F. O., to wit that plain English forms the primary, uniform, and most essential vehicle of communication in the field and the most certain and effective method of securing concerted action, considerably discounts the value of his illustration.

Let us now examine the next step in F. O.'s argument, *i.e.*, his attempts to demonstrate, on the assumption that a common vernacular language is necessary, that that language should be Hindustani. Now every one will concede that, apart from words of command and technical military expressions, it is very necessary that officers and men of the same unit should possess a common vehicle of communication in the shape of a serviceable knowledge of some vernacular. Without such a knowledge the training of troops would undoubtedly suffer owing to the inability of officers to impart instruction in various details connected with the principles of tactics, musketry, etc. Moreover, an inability between officers and men to converse intelligibly on topics of mutual interest would seriously affect *esprit de corps*, for it is inconceivable that in these circumstances officers could take any real interest in their men and understand their customs and modes of thought. It might seem that, if this is admitted, F. O.'s contention that Hindustani is the most suitable vernacular for the purpose in view needs no further demonstration. Before rushing to this conclusion, however, it is as well to take certain factors into consideration. In the first place we must bear in mind that the question at issue is whether for purposes of efficiency Hindustani should be the common vernacular of the whole Indian Army or whether each unit according to the race of the members composing it should adopt its own vernacular, and establish the latter as the colloquial vehicle between the officers and men composing that unit. The latter is the system which actually obtains at the present moment, and it was probably instituted for very good reasons, and after much thought.

At first sight it would seem an excellent theory to make Hindustani the *lingua franca* of the whole Indian Army. It would save British

officers much trouble, as they have to learn Hindustani in any case and would not be burdened with the obligation of learning another vernacular on appointment to a non-Hindustani speaking regiment. It would secure that uniformity of speech which F. O. craves for and which he seems to consider a matter of prime importance, perhaps because obsessed with that nightmare vision of a commander gibbering in an unknown tongue while a motley crowd of Sikhs, Gurkhas, and Pathans hang spellbound and inactive endeavouring to comprehend the stream of unintelligible Urdu which would otherwise have saved the situation.

I hope I am doing F. O. no injustice in saying that the advantages I have enumerated sum up the whole case in favour of Hindustani as the universal *lingua franca* of the Indian Army.

Now let us see whether the alleged advantages are not counterbalanced by real and serious disadvantages. In the first place, is it so certain that a thoroughly taught *lingua franca* throughout the Indian Army would be an unmixed benefit? What about the political aspect of the question? I will not enlarge on this, as its significance is sufficiently obvious, and if F. O. pauses to consider the matter, I think he will have no difficulty in picturing to himself a number of situations which might conceivably arise, in which the possession of a common tongue among different races in the army would prove infinitely more perilous than the hypothetical Tower of Babel situation which he so graphically portrays.

In the second place, the imposition of a compulsory standard of Hindustani on the whole Indian Army simply means that the burden of acquiring a new language is transferred from the best educated and most capable to those least educated and least capable. Instead of the officers who have comparatively little difficulty in acquiring a knowledge of the special vernacular of their unit, the rank and file of that unit, to whom Hindustani is often a completely foreign language, would have to undergo a long, painful, and laborious training in the new tongue, and this at a time when it is already difficult enough to get the non-Hindustani speaking sepoy to read and write even his own vernacular with fairly tolerable proficiency. From the tenor of his article I should imagine that F. O. supposes that the various races incorporated in the Indian Army are already fairly well acquainted with Hindustani, and only require a little extra polish, so to speak, in order to render them thoroughly proficient in it. He apparently assumes that Hindustani is spoken to a certain extent by all races, because it happens to be called the *lingua franca* of India. It is not so. Take Gurkhas for instance. There are a number of languages spoken in Nepal differing considerably from each other, but the *lingua franca* of Nepal is Khaskura not Hindustani, and though I cannot speak from personal knowledge I imagine that Pushtu bears much the same relation to the various Pathan dialects. Similarly, Assamese is the *lingua franca* of Assam, Tamil or Telegoo that of Madras, Punjabi that of the Punjab, and so on. It is true that

Hindustani (Urdu) was once known as the language of the camp, but this was at a time when the majority of native troops were Urdu speaking Muhammadans, and there is no more reason to infer that everywhere native troops actually spoke Urdu than that the whole of the troops under Wellington in the Peninsula denominated British must therefore have all spoken English; the fact being that the term British included a considerable foreign contingent, the individual members of which were in the main completely ignorant of the English tongue. F. O.'s deduction, therefore, that Hindustani should be the universal language of the Indian Army, because it was once called the language of the camp, seems to be faulty in more than one particular, inasmuch as it is doubtful whether the term was ever strictly correct, and, even supposing it to have been correct to a great extent, it was only so at a time when the component parts of the Indian Army differed very much less in race and language than they do at the present time. Consequently, as a mere matter of historical precedent, I do not think that F. O.'s case be established.

I now come to a third and more important consideration. Has F. O. ever considered that the primary object of acquiring any vernacular in a regiment is to establish a common bond of intercourse between the officers and men of the unit concerned, as distinct from a common vehicle of linguistic communication between units of the army at large? If he admits this proposition, does he expect us to believe for one moment that a language foreign to both officers and men, but a compulsory knowledge of which is demanded from both sides, forms a better and more satisfactory vehicle of intercourse than a language which is well known to the vast and lesser educated majority of the unit and only foreign to a small but highly educated minority? It stands to reason that if ninety-nine men out of a hundred speak a language as their mother-tongue, it is far easier to get the hundredth man to learn the language of the remaining ninety-nine than to get the whole lot to learn a language which is neither the vernacular of the ninety-nine nor of the hundredth man. In the case of sepoys whose vernacular is not Hindustani a serious hardship would be inflicted on them by compelling them to learn it, and moreover the results would probably prove extremely disappointing. Not only would much valuable time have to be expended over uncongenial and often unprofitable school work, but in addition it would have a most undesirable though unavoidable tendency to further the promotion and advancement of sepoys with the qualifications of a baboo rather than those of the typical fighting man. Moreover, even admitting the possibility of imparting a fair knowledge of Hindustani to non-Hindustani speaking races, can anyone maintain that as between officers and men of such races respectively there would exist anything like the same close understanding and *esprit de corps* as when the officers are able to write and converse in the specific vernacular of their men, Pushtu, Khaskura, or whatever it may be. These considerations may suffice to show that in the opinion of what I believe to be the great majority of officers, it would be a

very grave mistake to adopt F. O.'s suggestion for imposing Hindustani as the common language of the Indian Army at the expense of the vernacular languages prevailing in regiments according to their respective race or class composition.

L. H. B.

CAPTAIN HART'S PAPER ON REGIMENTAL ASSISTANCE IN THE
PROBLEM OF FOOD-SUPPLY IN WAR.

August 6th, 1910.

TO THE EDITOR,

SIR,—I have been reading with much interest the paper by Captain Hart in your issue of July, 1910, and as it is in many respects of great value, I should like to point out just one or two points in which the author falls into rather serious error. The first is on page 443, where he classes water with "waste," and states that it does "not in any way nourish the body" and can easily be dispensed with. This is a very common and a very dangerous error. Food is intended to do two things—to supply material for building up the tissues of the human body, and to furnish fuel for the human engine. There are other minor functions which are subsidiary and assist the two just mentioned, but they need not concern us here. As regards the building up of the tissues it will, I think, be accepted that the most important food is that which corresponds to the tissue forming the greater part of the body. Now this tissue is water. Water forms two-thirds by weight of the entire body, that is, if a man weighs 150lbs., 100lbs. out of that 150 consists of water. Human muscle consists of, roughly, four-fifths water and one-fifth protein; some tissues contain more, and some less. Bone, for instance, contains from 14 to 44 per cent. of water; fat from 8 to 15 per cent. Since this is the case, it is obvious that so far from our being able to dispense with water, it is absolutely necessary to build up our bodies. This can be proved in another way. In starvation it is possible for a man to use up all the fat in his body, and 50 per cent. of his protein tissues, and yet live, but if he lose only 10 per cent. of the water he dies. To return to the 150lbs. man. His body contains, as I have already said, 100lbs. of water, and it also contains about 23lbs. protein. He can afford to lose 12lbs. of protein in starvation, but not more than 10lbs. of water, that is one gallon. Take it in another way. All food-stuffs consist (except butter and sugar) largely of water. Beef contains 80 per cent. of water, bread about 50 per cent. In either case the limit of concentration possible (theoretically) is absolute dryness. That is to say, that theoretically it would be possible to reduce 1lb. of lean meat to $3\frac{1}{2}$ th ounces, and yet retain what is popularly considered its nutritive power. But if you want to eat that $3\frac{1}{2}$ th ounces of dried meat, you will have to add to it either before or after it gets to your stomach very nearly as much water as you have driven off from it before you can digest it. Here again it

is impossible to dispense with water entirely. If Captain Hart wishes for proof of this, I would recommend him to purchase and try to eat some dry plasmon, which contains about 10 per cent of water and and 80 per cent. of protein, without drinking anything at the same time. If he eats any large amount, say, 3oz., I think he will find that he will have to drink just about 12oz. of water if he is to escape rather severe indigestion. Let me give one more reason. When a man marches, his temperature rises perceptibly. If it is not to rise to a dangerous extent he must perspire, and his perspiration must evaporate, so that he may be kept cool. Unless there is a sufficient supply of water in his body he cannot perspire satisfactorily, and in that case his temperature will go up to a dangerous extent and he will suffer from heat-stroke. On all these accounts it is obvious that water cannot be dispensed with. A man must take into his body enough water either as part of his solid food, or as drink. If you deprive him of it in his solid food, as when you concentrate food by drying, you must supply him with it in liquid form. One way or another you must supply it.

The second point that I should like to draw attention to is the theories of Mr. Eustace Miles and Professor Chittenden as to the amount of protein that is necessary for sustenance. The digestion of protein food is one of the most complicated questions of physiology.

When any protein food is eaten, it is broken up into much simpler compounds in the stomach and intestine, and these are again built up in the body into the protein substances that form the muscular and other tissues of the body. Now it has been proved by experiment that the proteins of one body, say, the ox, are not the same as the proteins of another body, in this case man's. The latter is not therefore able to rebuild his bodily tissues direct from the beef he eats; he has to break up this beef into a large number of simple compounds from which he selects those which are suitable to his own tissues and rejects those which are not. The amount of protein that he must eat depends practically entirely on the number of suitable "end-products" as they are called which that protein contains. Quality is in fact of far more importance than quantity. The question goes further than this. The power of the body to make use of certain "end-products" depends not only on their quality, but also probably on the condition of the body at the time. Fatigue, thirst, anxiety, the nature of the other food eaten, numberless other causes, all affect the man's power of making the best out of the protein that he actually eats. As long as a man lives a sheltered life, with carefully prepared and selected food, he can undoubtedly live on a great deal less protein than the majority of us habitually consume. Take that same man, place him on a bare hillside on the frontier, unsheltered, exposed to constant risk of his life, with only preserved meat or half-starved "trck-ox" to eat, and you will find that his protein will have to be considerably increased if he is to keep in decent health. If Captain Hart wishes to understand thoroughly the effect of a low protein diet

continued for generations, he need only look at the average Bengali, who lives on a protein ration not very different from that laid down by Professor Chittenden. A very able piece of research was carried out on this point by Captain McCay of the Indian Medical Service, published as No. 34 of the Scientific Memoirs of the Officers, Medical and Sanitary Departments of the Government of India, the best analysis of the question with which I am acquainted. I would suggest to Captain Hart that he should approach the question in a different manner. The human body is an engine, a very superior engine it is true, since it makes more use of its fuel than any steam-engine, but still it cannot get more out of a pound of fuel than exists in that pound. The amount of food that a man needs is not that laid down by any theorist as generally healthful for himself, whether in London or in Yale, but precisely that amount which under the peculiar conditions in which he is living will supply him with the fuel that his engine wants. First find out the work your man has to do. State that in definite units of energy, then find out the food which will most economically supply that energy, and the problem is solved. I do not say the problem is an easy one. It is not, though it is simple enough in principle. Whether easy or not, those are the only lines on which the problem will be solved. There is a great deal that is good in Captain Hart's paper, and he recognises that the scientific aspect of the question is that on which it must be approached. I think he will find that if he takes it on the lines I have above suggested he will arrive at conclusions rather different from those to which he has been led so far.

Yours truly,

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REVIEWS.

War and the Arme Blanche. By E. Childers. 379 pp., with Introduction by Field-Marshal Earl Roberts, V.C., K.G., and index. 8vo. London, 1910. Edward Arnold. 7/6.

Reprinted from "Recent Publications of Military Interest," published by the General Staff, War Office.)

In this book Mr. Erskine Childers maintains, and claims to have proved, that for mounted troops in modern war the *arme blanche* is "as dead as the dodo." The essential points of the theories he advances are—that the rifle is always the master of the sword; that although the latter may be of use on some occasions, those occasions are very few, and that even then the rifle can be used instead of the sword, with better results; that it is as impossible for mounted troops to become efficient in the use of both rifle and sword as it is for a man to serve two masters; and that the only way to ensure the efficient training of our cavalry in the use of the rifle is to deprive it of lance and sword altogether. Mr. Childers favours bold offensive action, but always with the object of overwhelming the enemy by fire and never with the object of using cold steel. Cavalry charges he believes in, but not the charge as now understood; in his view cavalry should charge to "within 5, 10, 50, or 100 yards" of the enemy, and then shoot him down, either from the saddle, or dismounting to fire. In the term "cavalry" he would include all mounted troops, maintaining that all should be armed alike and act on the same principles. Fire from the saddle should be freely used, even, it would appear, when moving at speed, as in pursuit.

Mr. Childers bases his views mainly on the experiences of the South African War, but he quotes the Russo-Japanese War in confirmation, and he claims that the American Civil War and the campaigns of 1866 and 1870-71 also illustrate the truth of his contentions. The fact that a decided majority of the leaders of military thought throughout the civilised world are believers in "the terror of cold steel" is an argument to which he attributes no importance. He is quite satisfied that their judgment is misled either by the glamour of cold steel, or by a mistaken belief that the South African War was abnormal, a view with which he is in entire disagreement.

Before discussing Mr. Childers' theories, it will be well to consider the value of the evidence on which they are based. It has been claimed that his arguments are historically correct. This claim cannot be admitted. He quotes historical facts, certainly, but the deductions he makes from them are his own. "Facts," as a great lawyer has said, "cannot lie, but they can and often do deceive." The point which the reader of "*War and the Arme Blanche*" has to decide is whether, in this case, they have deceived Mr. Childers or

those who differ from him. Judging by the official training manuals, the ruling military authorities of every civilised nation are numbered amongst the believers in cold steel. Amongst them are many able, earnest, and experienced soldiers, by no means all cavalymen. They have as deep a knowledge of historical facts as Mr. Childers has. They have even more at stake to induce them to weigh deductions carefully, since they may be called upon to act on them at any moment. They have more practical knowledge of human nature in war to guide them in drawing conclusions from history, and human nature in war is a consideration on which the practical applicability of all military theory depends. Remembering that it is deductions from facts that are in dispute, and not the facts themselves, we cannot think that any impartial reader will be prepared to follow Mr. Childers in throwing the opinions of such men aside as being biassed and worthless. We claim no infallibility for them, but neither do we concede any to Mr. Childers. We cannot agree that Mr. Childers has established his charge of undue bias in favour of the sword, and we cannot see that he is any less open to a charge of undue bias in favour of the rifle. Having said so much as to the value of the evidence to be weighed, we may now turn to the matter in dispute. A careful perusal of "*War and the Arme Blanche*" leaves us under the impression that the difference in opinion between Mr. Childers and our training manuals is by no means so great as he seems to think it is. His views on the value of vigorous offensive methods and on the combination of fire power with mobility are, up to a certain point, in agreement with "*Cavalry Training*." No one is likely to deny—"Cavalry Training" certainly does not do so—that the general principles of fire action are the same for all mounted troops, although the degree of skill with which they may be able to employ those principles must be expected to vary with the duration and thoroughness of the training they have undergone. No one can deny that favourable opportunities for the use of the *arme blanche* are not numerous in modern war as compared with the number of opportunities for using the rifle.

Mr. Childers is not one of those who consider it impossible for cavalry to charge home, under favourable conditions, in the face of modern rifle fire; and he clearly recognises the need to charge home in order to force a decision. So far, therefore, no great principle seems to be in dispute. The first real point of difference that we can find between Mr. Childers and "*Cavalry Training*" is his statement that when cavalry has charged home it will always find the rifle a more effective weapon than cold steel. The next is the statement that cavalry cannot be trained to efficiency in both rifle and sword. If the first of these two statements be true, it is unnecessary to examine the second, since there would obviously be no further need for the sword if the rifle is always more effective at close quarters. If the second theory be true, we agree that the rifle is so much more generally useful than the sword that the latter should be abandoned in its favour. These two questions are, therefore, worthy of very

close consideration. A decision on the first of them seems to depend a good deal on the value of fire from the saddle. If it is really possible effectively to use the rifle from the saddle at close quarters, we can believe that cavalry would soon throw away sword and lance in war. If it is not possible, however, then mounted cavalry without a steel weapon has no adequate means of offensive action at close quarters or of self-defence if surprised when in motion.

Turning to such facts as we have at our disposal, we cannot find that the efficacy of saddle-fire has been established. It was used in the American Civil War. It was also used by both sides in South Africa. In both wars its use appears to have been exceptional, while its material effect is stated by those who experienced it in South Africa to have been very slight, although the Boers who used it had had exceptional training, and were probably greater adepts than town-bred soldiers could ever become. The most claimed for it by British officers who used it is that it may sometimes have a useful moral effect.

To fire from the saddle at the halt and in motion would necessitate the prolonged and habitual training of the horse as well as of the cavalry soldier, and we can find no grounds for a belief that such fire would prove effective, except, perhaps, in the case of individuals in special circumstances. The difficulty in shooting with any degree of accuracy from a horse moving at speed requires no explanation. The difficulty in shooting from a horse pulled up short from a charge and under fire—since the enemy must be presumed to be resisting—does not seem likely to be less.

For these reasons it seems to us that cavalry, charging on the principle advocated by Mr. Childers, must dismount to fire on reaching close quarters. When the enemy is sufficiently accommodating to leave cover close to him unwatched and unguarded, to which the cavalry can gallop, and behind which the horses can be left, this operation is feasible. If he does not do so—which we take to be the normal case—it seems to us that it would be more difficult for cavalry to pull up and dismount in the open, under close rifle fire, than to charge home, led by its officers. It is worthy of note that troops using a rifle cannot be so led. Further, it seems to us that this pulling-up and dismounting at the last moment—even if men could be got to do it, which we doubt—would be likely to prove a very costly proceeding, and that the enemy, if he could be given a choice, would prefer to meet such a manœuvre rather than a charge home with cold steel.

In considering the question of weapons, it is not sufficient to confine our investigations to the original attack. We must also consider possible counter-attack. For instance, Mr. Childers' analysis of the Boer charge at Roodewal is incomplete. He considers what might have been the value of the steel weapon and a knee-to-knee formation to the Boers, and he concludes that they would have been useless. We agree. The failure of the Boers on this occasion must be attributed to the absence of any moral

ascendency over the enemy. The surprise failed; they had no numerical superiority, and there was no fire preparation except the totally insignificant saddle-fire during the charge itself.

Grenfell met the attack by fire: but if his force had been armed with sword or lance, and trained to rapid manœuvres combined with cohesion, it is an interesting speculation whether he might not have gained better results by means of a "shock" counter-attack. It seems to us that Grenfell's most effective reply to the Boers would have been to meet them by fire from a portion of his force till their attack faltered, and then to clinch the matter by a charge of the remainder with the *arme blanche*.

This is one of the examples quoted by Mr. Childers. It seems to us to show the value of a training in which various tactical methods and various weapons can be utilised and combined. It provides also an example of the failure of Mr. Childers' method, and affords an opportunity of illustrating how an effective use can be made of the *arme blanche* against that method when wrongly applied.

We will next consider an example of the success of Mr. Childers' proposed methods, namely, Bakenlaagte; but before doing so we desire to say a few words as to certain conditions on which the chances of success of any method of attack seem to depend.

Mr. Childers is emphatic in his view that it is not necessary or even desirable for the form of offensive which he advocates, to depend on covering rifle fire or artillery support, to enable the objective to be reached. He disclaims the need for any such assistance for his charges, and bases this belief on the invulnerability to rifle fire of the horseman moving at speed.

Here we are in direct conflict with him. We believe that charges against riflemen, whether made as he proposes or with cold steel, can only be successful, in the face of opposition which is not altogether insignificant, if the conditions allow the attack a certain moral ascendency. This moral ascendency may result from surprise or overwhelming numbers, but where these conditions are absent it can only be obtained by establishing superiority of fire as a preliminary step. The mere movement at speed aided by saddle-fire is, we contend, insufficient to produce it.

We believe, further, that when once sufficient moral ascendency has been gained, the nature of the weapon with which cavalry is armed will not affect the chances of its being able to charge home. The question at issue is as to the most effective means of obtaining good results after charging home.

On this point Bakenlaagte seems to offer some evidence. On the British side there was a harassed rear-guard which had been withdrawing for many hours in the face of vigorous attacks, and was, in addition, facing a cold-driving rain. On the Boer side we have the arrival of reinforcements at the critical moment in sufficient strength to give it an overwhelming numerical superiority. The arrival of these reinforcements was quite unknown to the British till

the charge actually took place, so that a certain element of surprise was introduced.

For the details of the action we must refer the reader to the *Times* History of the War and the map contained in that work. According to the author of this account, Botha initiated his charge at the very moment that he saw the British rear-guard rise and mount in order to withdraw from Ridge A to Gun Hill. The moment was admirably chosen, and the circumstances all contributed to increase the *moral* of the attack while reducing that of the British rear-guard.

As to the opposition encountered, we read that Greatwood's and Lynch's detachments of the Buffs (infantry) were overwhelmed between Ridge A and Gun Hill, the Boers "dropping a few men to disarm their prisoners." It is a small point, but we doubt whether this slight weakening of the attacking force would have been necessary if these detachments had been ridden over, say, by a lancer brigade.

The description of the remainder of the charge is worth quoting in full—"With scarcely a check the charge continued; it caught, swallowed up, and captured both the covering sections of Scottish Horse and mounted infantry, and ended finally in the hollow at the foot of Gun Hill. This was dead ground, both from Ridge B and Gun Hill, and here the Boers flung themselves from their ponies and pressed on foot up the hill, firing and shouting as they came."

No account could illustrate more clearly the essential difference between cavalry action and that of mounted riflemen. The Boers, in the full tide of success, judged it necessary to dismount at this critical moment. The result was that they were obliged to enter into a fire struggle which lasted 20 minutes before the hill was captured. We are told that during that time "no reinforcements reached the hill" and that the only counter-attack attempted during the action was an effort made by two companies of the Buffs under Major Eales, after the hill had been captured, when the conditions were entirely unfavourable; but it is easy to conceive what a difference the 20 minutes' delay to the attack might have made in the results of the day.

We claim that a cavalry force as ably led would not have dismounted at the foot of the slope and afforded the enemy the opportunity to recover his initial disadvantage. We are told that the dead ground reached to within 30 yards of the British firing line. We do not believe that a charge of disciplined cavalry, which had reached the foot of the slope, would have pulled up, or could have been stopped by fire in the last 30 yards. We must remember the absolutely overwhelming numbers and the elation of the initial success. In our opinion cavalry handled on the principles inculcated in Cavalry Training would have ridden over the hill inflicting many casualties on the British on the way; the original line would have swept on to the farm at Nooitgedacht, and spread consternation and

havoc amongst the convoy, while the supporting squadrons dealt with any resistance that might be left in the defenders of the hill. In fact, a partial success might have been turned into a complete victory.

Our conclusions from the facts of Bakenlaagte are that the success was due to causes other than the armament of the Boers and the formation in which they charged, and that the limitations in the measure of the success is evidence in favour of the *arme blanche* and of the methods laid down in Cavalry Training.

It may be claimed that if the Boers, armed as they were, had not halted, they would have gained a complete success. The reply seems to us to be that they would not have halted if they had been armed with steel and trained to depend on it under such conditions.

In fact, the example we have just quoted illustrates an important virtue claimed for the *arme blanche*. The tendency of human nature under fire is to seek cover and hold on there, since to rise from it increases the danger. This tendency works in two ways when both sides are under heavy fire: just as the defending side inclines to hang on in its trenches, so the attacking side tends to remain under cover and to seek to shoot the enemy out of his position without exposing itself. If proof of this tendency under modern conditions is required, a study of the operations in Natal for the relief of Ladysmith will afford it.

The chief reason why infantry soldiers are given a bayonet is to foster in them the desire to close with the enemy. They are taught that this must be their object and that the primary use of fire is to assist their forward movement in the direction of the enemy with a final bayonet charge in view. The actual amount of killing done by the bayonet in modern war has been comparatively small. After South Africa many theorists recommended its abolition. Yet deeper thinking has led to the conclusion that the moral effect of the bayonet is out of all proportion to its material effect, and not the least important of the virtues claimed for it is that the desire to use it draws the attacking side on. This theory has been accepted by those best qualified to judge by experience of human nature in war. There seems to be a great similarity of thought between those who favoured the abolition of the bayonet and those who desire to deprive cavalry of the *arme blanche*. We also think there would be a similarity in the results. To take the sword from cavalrymen would be, to some extent, to take away their desire to close—to encourage them to seek for effect by long-range fire. It might constitute a serious obstacle to the realisation of Mr. Childers's methods of charging.

This encouragement of an offensive spirit is one effect of a steel weapon. What is its effect on the enemy? Is the "terror of cold steel" really a myth? On this point let us examine, for example, the battles of Wörth and Gravelotte. Time and again the Germans held on to the ground they had won under a devastating fire. Time and again they fled before French bayonet charges, without

awaiting them. Are foot soldiers charging with bayonets more terror-inspiring, or more difficult to stop by bullets, than charging cavalymen, who believe in their ability to charge home?

Mr. Childers may not agree in the value of examples taken from a war which was fought before the introduction of the magazine rifle, but if the magazine rifle is to be upheld as a nerve soother where cold steel is concerned, we must not ignore the effect of the same weapon in producing nerve tension when in the hands of the enemy. We hold that this attribute of the magazine rifle will in reality tend to maintain if not to enhance the terror of cold steel in the battles of the future. In fact, we look to the magazine rifle to produce the situations in which the fear of cold steel will give us the victory. This is indeed the basis of all modern tactics.

Although we maintain that the *arme blanche* is by no means obsolete, it must be admitted that if Mr. Childers's contention could be upheld as to the impossibility of training cavalry to the efficient use of both rifle and cold steel, there would be a strong case against the retention of sword or lance. The arguments given in the foregoing pages refer more particularly to the battlefield, on which the results of all military operations are decided. Even on the battlefield, however—still more in the operations preceding the battle—it cannot be denied that for one opportunity of using cold steel effectively, there will be many of using the rifle. For this reason there can be little doubt that, if cavalry cannot be made efficient in both weapons and must be restricted to one, that one should be the rifle.

Mr. Childers maintains that experience shows that cavalry cannot be trained to both weapons. He appeals to history. Has history spoken definitely on this problem? In what campaign, up to date, has cavalry been employed that had been carefully trained in the use of both weapons? We are not aware of one. The Boers were not trained in the use of the *arme blanche*. Our own cavalry in South Africa had not been seriously trained in the use of the rifle. It was armed with an inferior firearm, and had fired a few rounds with it annually, but rifle shooting and rifle tactics held a very different position in its training, and in its regard, to what it holds now.

Mr. Childers quotes the American Civil War. In his reference, however, to this war, he omits to mention that, although a rifle was added to the equipment of the United States cavalry soldier shortly after the war commenced, the sword and revolver for use at close quarters were not discarded, and that this equipment, as a result of the experience gained in the American Civil War, has been retained ever since.

It would be out of place here to discuss the merits and defects of the breech-loading pistol in addition to or in substitution for the *arme blanche*, as the main point is whether the mass of the cavalry employed in that war was trained at all before the war.

It is useless to claim that history has given a final verdict on this problem. So far as history has spoken, its voice appears to

us to be in favour of the possibility of cavalry being trained to use both weapons, i.e., the rifle and the *arme blanche*. Our cavalry men, trained to *arme blanche* work, adapted themselves, with considerable success, to the use of the rifle in South Africa. Although there seems to be a good deal of popular misapprehension on the point, cavalrymen used the *arme blanche* freely in the American Civil War, and it appears that the use of it tended to increase as the war went on; they also used the rifle with considerable efficiency.

We believe that cavalry which is capable of using either weapon, as occasion may demand, will be more useful in war than cavalry which can only use one of the two. We believe that the possibility of becoming efficient in both must remain a matter of opinion until cavalry, which has been carefully trained to both, has been fully tried in war. And we believe, meanwhile, that the opinion of experienced cavalry officers on training is a safer guide to follow than the opinion of Mr. Childers. Their opinion is that regular cavalry can be trained to both. It must be remembered that our present peace training aims at producing dash, cohesion, and discipline, combined with an offensive spirit and good horsemanship: and that, even if Mr. Childers proves correct in his views, the time spent in inculcating these qualities cannot be said to have been thrown away unless it can be proved that the training in fire tactics has been neglected in consequence to a dangerous extent.

The truth seems to be that the real difficulty of the problem lies less in training the men to be capable of using both sword and rifle than in educating their officers to judge rapidly which weapon to employ at any given moment. No doubt, errors of judgment must be expected in this matter, as they must be expected in all operations of war; but we cannot afford to abandon a valuable weapon for that reason. Moreover, it does not seem to us that there will be much—if any—more difficulty in judging when to charge with the *arme blanche* than there would be in judging when to undertake the style of charge that Mr. Childers recommends.

The judicious selection of opportunities for, and the skilful execution of a charge undoubtedly call for much previous study, thought, and practice: but, so far as our regular cavalry is concerned, the necessary attention can, and will, be given to the problem. Professional officers, and men who serve for seven or eight years with the colours, have both the time and the opportunity to learn. It is different with our mounted troops other than regular cavalry, however. There can be no reasonable doubt that neither the officers nor the men composing these troops can learn the use of both rifle and *arme blanche* in their short peace training. This being so, it seems obvious that they should train in peace with the rifle only, that being far the more generally useful arm.

It may be argued that it is illogical to claim that the *arme blanche* gives additional power to cavalry, and then to recommend that mounted troops, other than cavalry, should be armed with the

rifle only. The reply to such a contention is that yeomanry and similar bodies of troops, who train only for a few days in the year, cannot be expected to meet highly-trained regular cavalry on equal terms, however we arm them; and matters cannot be equalised by any increase in the number of weapons they carry. On the whole, they will stand a better chance armed with one weapon which they have acquired some skill in using, than if they had more than one, were unskilful with each, and lacking in judgment as to which to use. Moreover, there are other factors of which considerations of space forbid the discussion here, such as the nature of the country that yeomanry are primarily intended to fight in, the nature of the duties that would be allotted to them in war, and the possibility of arranging for them to work with regular cavalry, thus combining fire power with the sword. Moreover, if time were available after embodiment, it would be possible to equip yeomanry with the sword and to instruct them in its use.

The combination of the power of the two weapons seems to us the ideal to aim at, and we cannot agree that it is beyond our reach.

It may be, that there is sometimes a tendency to favour training with the steel weapon at the expense of training with the firearm. We agree that this is unsound, but we do not agree that it is necessary to take away sword and lance altogether in order to correct this tendency, and we think that in proposing such a remedy Mr. Childers has rushed into the extremes that he complains of in others.

Finance and War. By Captain R. S. Hamilton-Grace. 72 pp., 8vo. London, 1910, Hugh Rees, Ltd. 2.6 net.

There are three factors which influence a campaign, from its commencement to the end of hostilities. These are policy, public sentiment, and finance. Most soldiers pay attention to the relationship between policy and strategy; some consider what the effect of public sentiment may be, and how that effect may be turned to account, or counteracted; but few give even a passing thought to the question of finance. "If," says Captain Hamilton-Grace, in the preface to his book, "I have caused a few people to think out this important question for themselves, I shall be satisfied." The soldier is the only man who has sufficient knowledge of war to recognise what the effect of the financial question may be. He, therefore, is the only person who can put forward proposals calculated to neutralise those effects. If, however, attention is to be paid to the proposals of the soldier on this point, as on all other questions of military interest, there must be unanimity of thought amongst soldiers on the question. Every soldier, therefore, should consider this problem of finance in war. To do so, he must take advantage of every opportunity which presents itself of acquiring information regarding the principles of national finance.

The author gives us many interesting figures in his book. Not the least striking are those of the war of 1870, which show the difference in the cost of a war to a nation which has prepared for war, and to one which has not. The author shows that whereas Germany was actually £174 millions to the good after the war, the cost to France was £695 millions. It is easy to juggle with figures, and there are many things besides pounds, shillings, and pence, which go to make up the profit and loss account of a war. We commend these figures, however, to those who wish to see the premia of our national insurance reduced.

The author calculates that a normal war of ours (in which the expeditionary force is sent overseas, and the territorials are mobilized in England) will cost the nation £334,000 a day, or £121,910,000 a year.

Captain Hamilton-Grace gives us a detailed account of how the cost of war has been met in the past, and a chapter dealing with the effect of money on war, and *vice versa*. He details the ideas which find acceptance in Germany regarding the future wars of that country. He concludes with an appreciation of our own situation, and puts forward certain proposals for improving our position. These may be summed up as being:—

1. The introduction of tariff reform, while peace still exists.
2. Circulating more paper-money in peace-time, and making paper money a legal tender during war.
3. The maintenance of a compulsory gold reserve.
4. Decreasing the comparative cost of the army by the introduction of compulsory service.

We do not propose to criticise these proposals. We hardly feel ourselves qualified to do so, owing to the questions of policy involved. But the arguments with which the author supports his proposals are clear and sound from a military point of view. The whole book is constructive, and affords much food for thought. It is well worth careful study, not only by soldiers, but by civilians. We would draw attention, particularly, to the last of the author's conclusions, which are summarised at the end of the book. It reads:—

"The people of England should realise that *unless they make sacrifices in time, i.e., form a national insurance by preparations for war*, they will suffer the same losses as did France in 1870." And he adds a foot-note to the effect that, in a similar case now, the indemnity demanded would be, probably, £1,000,000,000 instead of £200,000,000. (The italics are ours.)

Night Operations for Infantry, by Colonel C. T. Dawkins, C.M.G.
64 pp. 1s. 6d. nett. Gale and Polden.

In this little book the author advocates a more systematic method of training our men for night work, and suggests that such training should begin with elementary instruction while the recruit is still at the depôt. The book, which is written for the company officer, is full of useful hints, and is cordially to be recommended.

The Army Annual and Year Book, 1910. Edited by Major B. F. S. Baden-Powell and Lient.-Colonel H. M. E. Brunker. 384 pp. 7s. 6d. nett. William Clowes.

The 1910 volume of this annual, the publication of which has now been undertaken by Messrs. William Clowes, forms a valuable book of reference on army affairs. Amongst its many chapters it contains an excellent article on the defence of the Empire and on the Imperial General Staff; the detail of the Army Estimates; a long and accurate account of the military forces of the Crown, including the overseas dominions and Lord Kitchener's report; a chapter on recruiting, including the annual report; a list of the most important military books recently published; an account of recent military inventions; and a paper on aviation. To officers studying the subject "Administration" for the Staff College examination the book should prove invaluable.

ACKNOWLEDGMENT.

We acknowledge with thanks the receipt of the following books:—

The War of Secession, 1861-1862, by Major G. W. Redway, with maps. Special Campaign Series. London: Swan Sonnenschein and Co., 1910. 5s. net.

A Précis of Strategy, by Lieut.-Colonel W. D. Bird, D.S.O., with maps and plans. London: Hugh Rees, Ltd. 3s. 6d. net.

Field Fortification. Notes on the text-books, by Lieutenant-General H. D. Hutchinson, C.S.I. London: Gale and Polden. 4s. net.

German Official Account of the Russo-Japanese War. The Scha-Ho. Authorised translation, with maps. London: Hugh Rees, Ltd. 15s. net.

(Acknowledgment in this column does not preclude a book from being reviewed when space permits.)





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